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# SESSIONAL PAPERS

## VOLUME 6

## FOURTH SESSION OF THE NINTH PARLIAMENT

OF THE

## DOMINION OF CANADA

SESSION 1904

66249
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VOLUME XXXVIII

☞ See also Numerical List, page 5.

# ALPHABETICAL INDEX
## OF THE
# SESSIONAL PAPERS
## OF THE
# PARLIAMENT OF CANADA

FOURTH SESSION, NINTH PARLIAMENT, 1904.

A

Adulteration of Food.. 14
Agricultural Implements. 54
Agriculture, Annual Report. 15
Alaska Boundary Award..... 46, 46a
Aluminum Imports.......... 109
Anglo-American Telegraph Co.. 73, 73a
Archives, Canadian..... 18
Athabaska Landing, Petroleum at... 118
Atlantic Coast Fisheries 97
Auditor General, Annual Report.. 1

B

Banks, Chartered..... 6
Banks, Unpaid Balances in.. 7
Binder Twine............... 128, 128a
Bonds and Securities............. 47
Boyd, Mr. 81
British Canadian Loan and Investment Co 48
British Columbia Industrial Disputes.... 36a
Britton, Justice......... 142
Bronte Harbour....... 80

C

Canada Eastern Railway...... 141
Canadian Contingents to South Africa 39
Canadian Goods in U. S. Vessels..... 62
Canadian Northern Railway......... 4, 133
Canadian Pacific Railway:
  Business with Interior Department.... 53
  Lands sold by.......... 56
Canadian School of Musketry........... 138
Cattle-guards.................... 98
Chartered Banks............ 6
Cheese-cooling Rooms....... 95 to 95b
Chicken-fattening in P. E. I..... 136
Civil Service:
  Appointments and Promotions.... 58
  Examiners.... 31
  Insurance.... 41
  List............. 30
  Superannuations. 38
Coal or other Fuel Supply.... 108
Cold Storage.... 65, 65a
Commissioner of Lights. 90
Conference at Washington 125
Cotton Imports..... 84
Criminal Statistics.. 17
Crude Petroleum. 118

D

Dairy Products....... 143
Davis, Michael P. 129
Delegates to Europe... 88
Dividends unpaid in Banks 7
Dominion Lands.......... 51, 52
Dominion Police............. 45
Doukhobor Reserve. 60
Dry Docks on Pacific Coast.......... 86
Dugas, Blaise. 94
Dundonald, Earl of.. 113, 113a

E

East Richelieu Valley Railway. 70
Electric Light, Inspection of... 13
Estimates......... 3 to 5d
Evanturel, Lieut.-Col.. 85, 85a
Exchequer Court..... 59
Experimental Farms..... 16

F

Fair Wages........... 140, 140a
Fire Insurance Premiums.. 110
Fisheries, Annual Report....... 22
Fish-trap Licenses........... 144
Floods by Richelieu River. 77
Fort William, Telephones for.... 99
France, Steamers to............ 122

G

Gallagher, L. L.............. 72
Garrison Common, Toronto........... 96
Gas, Inspection of......... 13

**G**

*Gauss*, Steamship .......... 146
Geographic Board .......... 21*a*
Geological Survey Report .......... 26
Goodrick, Henry .......... 116
Government Telegraph Service .......... 19*a*
Governor General's Warrants .......... 40
Grand Trunk Pacific Railway....37, 37*a*, 100, 102, 117, 124
Gregory, R. W., Lieut.-Col .......... 130, 13*a*

**H**

Half-breed Scrip .......... 67 to 67*d*
Hampton Station, N. B .......... 82
Harbour Commissioners .......... 23
Hope Island .......... 61, 61*a*
Huntingdon Post Office .......... 81

**I**

Ice-breakers .......... 147
Immigration Agents .......... 64 to 64*b*
Indian Act .......... 55
Indian, Affairs, Annual Report .......... 27
Industrial Disputes in B. C .......... 36*a*
Inland Revenue, Annual Report .......... 12
Insurance, Abstract .......... 9
Insurance, Annual Report .......... 8
Interior, Annual Report .......... 25
Irena Post Office .......... 101
Iroquois Indians .......... 105

**J**

Jackson, J. B .......... 107, 107*a*
Judge Winchester .......... 102
Justice, Annual Report .......... 34

**L**

Labour, Department of, Annual Report .......... 36
*Le Malou*, Steamer .......... 132
Library of Parliament, Annual Report .......... 33
Lobster Fisheries .......... 97, 123

**M**

Mabou Creamery .......... 134
Mails to United Kingdom .......... 89
Major General, Earl of Dundonald .......... 113, 113*a*
Manchester Liners .......... 75
Marine and Fisheries ; Chief Engineer .......... 90
Marine, Annual Report .......... 21
Maritime Provinces, Steamships for .......... 76
Matane, Postmaster at .......... 119
Measures, Inspection of .......... 13
Militia and Defence, Annual Report .......... 35
Militia, 9th Regiment of .......... 112
Montreal Fire Insurance .......... 110
Montreal Turnpike Trust .......... 83, 115
Mounted Police .......... 28
Mutual Reserve Life Association .......... 69

**N**

Nappan Dairy Station .......... 135
Nash, E. A .......... 93
National Transcontinental Railway.. 37, 37*a*, 100, 102, 117, 124
New Brunswick Appeal Case .......... 127
Ninth Regiment of Militia .......... 112
North-West Irrigation .......... 50
North-West Mounted Police .......... 28

**O**

Ossekeag, N. B .......... 82
Ottawa Improvement Commission .......... 42
Ouellet, Major .......... 85, 85*a*
Over-rulings of Treasury Board .......... 39

**P**

Pacific Cable .......... 106
P.E.I., Chicken-fattening in .......... 136
P.E.I., Deep-Sea Fisheries .......... 137
P,E.I., Lobster Industry .......... 123
P.E.I., Railway .......... 104 to 104*b*
P.E.I., Telegraph Service .......... 73, 73*a*
Penitentiaries, Annual Report as to .......... 34
Petroleum at Athabaska Landing .......... 118
Police, Dominion .......... 45
Police, North-west Mounted .......... 28
Port Arthur, Telephone for .......... 99
Postmaster General, Annual Report .......... 24
Privy Council Appeal Cases .......... 127
Protocol of Washington Conference .......... 125
Public Accounts, Annual Report .......... 2
Public and Other Works .......... 63
Public Printing and Stationery .......... 32
Public Works, Annual Report .......... 19

**Q**

Quarantine Matters .......... 121
Quebec Central Railway .......... 114

**R**

Railway Cattle-guards .......... 98
Railways and Canals, Annual Report .......... 20
Representation in House of Commons .......... 127
Richelieu River Floods .......... 77
Ross Rifle Factory Co .......... 91

**S**

Saskatchewan River .......... 78
Savard, P. V .......... 87 $^{(1)}$ 87 $^{(2)}$
Secretary of State, Annual Report .......... 29
Shareholders in Chartered Banks .......... 6
Sheep, Shipment of, U.S .......... 120
Shipping, List of .......... 21*b*
South Africa Contingents .......... 139
South Shore Railway .......... 70
St. Alphonse Wharf .......... 145
Steamer *Le Malou* .......... 132

S

Steamship *Gauss* .......... 146
Steamship Service to France .......... 122
Subsidy for Steamships .......... 76

T

Telegraph Service, Government .......... 19a
Thermographe Records .......... 65, 65a
Timber Limits .......... 66, 66a
Timber on Hope Island .......... 61, 61a
Toronto Garrison Common .......... 96
Toronto Island and Harbour .......... 79
Trade and Commerce, Annual Report .......... 10
Trade and Navigation, Annual Report .......... 11
Trade Unions .......... 103
Transatlantic Steamship Companies .......... 71
Treadgold Syndicate .......... 126
Treasury Board Over-rulings .......... 39
Trent Valley Canal .......... 49, 49a

U

Unclaimed Balances in Banks .......... 7
Unforeseen Expenses .......... 43
United Counties Railway .......... 70

V

Vancouver Engineering Works .......... 86
Vegetables and Fruits from U.S. .......... 92
Ventilation of Railway Cars .......... 68
Ventilation of Ships .......... 65, 65a
Vessels, List of .......... 21b

W

Walkerton Mail Service .......... 57
Warrants, Governor General's .......... 40
Weighing Dairy Products .......... 143
Weights, Measures, etc. .......... 13
Winchester, Judge .......... 102
Winnipeg and Hudson's Bay Railway .......... 133

Y

Yukon:—
  Liquor Permits .......... 111
  Justice Britton and Commissioners .......... 142
  Ordinances .......... 44
  Rescinding Treadgold Privileges .......... 126
  Yukon Territory Act .......... 131

See also Alphabetical Index, page 1.

# LIST OF SESSIONAL PAPERS

*Arranged in Numerical Order, with their titles at full length: the Dates when Ordered and when presented to the Houses of Parliament: the Name of the Senator or Member who moved for each Sessional Paper, and whether it is ordered to be Printed or Not Printed.*

## CONTENTS OF VOLUME B.

Census of Canada, 1901. Second Volume.......... .....*Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 1.

(This volume is bound in two parts.)

**1.** Report of the Auditor General, for the fiscal year ended 30th June, 1903. Presented 22nd March, 190 by Hon. W. S. Fielding.......... ............*Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 2.

**2.** Public Accounts of Canada, for the fiscal year ended 30th June, 1903. Presented 16th March, 1904 by Hon. W. S. Fielding.... ... ............*Printed for both distribution and sessional papers.*

**3.** Estimates for the sums required for the services of Canada, for the year ended 30th June, 1905. Presented 16th March, 1904, by Hon. W. S. Fielding..*Printed for both distribution and sessional papers.*

**4.** Supplementary Estimates for the year ending 30th June, 1904. Presented 22nd April, 1904, by Hon. W. S. Fielding..... .. ..... .... ......*Printed for both distribution and sessional paper .*

**5.** Further Supplementary Estimates for the year ending 30th June, 1904. Presented 30th May, 1904, b Hon. W. S. Fielding.... ... .... ..............*Printed for both distribution and sessional papers.*

**5*a*.** Further Supplementary Estimates for the year ending 30th June, 1904. Presented 28th June, 1904 by Hon. W. S. Fielding....... ............ ....*Printed for both distribution and sessional papers*

**5*b*.** Supplementary Estimates for the year ending 30th June, 1905, Presented 25th July, 1904, by Hon W. S. Fielding.. . . .. .... ...... .... ...*Printed for both distribution and sessional papers.*

**5*c*.** Further Supplementary Estimates for the year ending 30th June, 1904. Presented 3rd August, 1904, by Hon. W. S. Fielding...... .... ..........*Printed for both distribution and sessional papers.*

**5*d*.** Further Supplementary Estimates for the year ending 30th June, 1905. Presented 3rd August, 1904, by Hon. W. S. Fielding ............ .. ........*Printed for both distribution and sessional papers.*

**6.** List of Shareholders in the Chartered Banks of Canada, as on 31st December, 1903. Presented 17th May, 1904, by Hon. W. S. Fielding... .... .... *Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 3.

**7.** Report of dividends remaining unpaid, unclaimed balances and unpaid drafts and bills of exchange in Chartered Banks of Canada, for five years and upwards, prior to December 31, 1903. Presented 26th May, 1904, by Hon. W. S. Fielding.........*Printed for both distribution and sessional papers.*

**8.** Report of the Superintendent of Insurance, for the year ended 31st December, 1903.
*Printed for both distribution and sessional papers.*

**9.** Abstract of Statements of Insurance Companies in Canada, for the year ended 31st December, 1903. Presented 13th April, 1904, by Hon. W. S. Fielding.
*Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 4.

**10.** Report of the Department of Trade and Commerce, for the fiscal year ended 30th June, 1903. Presented 16th March, 1904, by Hon. J. Sutherland. . *Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 5.

**11.** Tables of the Trade and Navigation of Canada, for the fiscal year ended 30th June, 1903. Presented 16th March, 1904, by Hon. W. Paterson . . . . . *Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 6.

**12.** Inland Revenues of Canada. Excise, etc., for the fiscal year ended 30th June, 1903. Presented 16th March, 1904, by Hon. L. P. Brodeur............ . *Printed for both distribution and sessional papers.*

**13.** Inspection of Weights, Measures, Gas and Electric Light, for the fiscal year ended 30th June, 1903. Presented 16th March, 1904, by Hon. L. P. Brodeur.
*Printed for both distribution and sessional papers.*

**14.** Report on Adulteration of Food, for the fiscal year ended 30th June, 1903. Presented 7th April, 1904, by Hon. L. P. Brodeur.......... ............... *Printed for both distribution and sessional papers.*

**15.** Report of the Minister of Agriculture, for the year ended 31st October, 1903. Presented 22nd March, 1904, by Hon. W. S. Fielding ................ *Printed for both distribution and sessional papers.*

**16.** Report of the Director and Officers of the Experimental Farms, for the year 1903. Presented 27th May, 1904, by Hon. S. A. Fisher............. ... *Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 7.

**17.** Criminal Statistics for the year ended 30th September, 1903.
*Printed for both distribution and sessional papers.*

**18.** Report on Canadian Archives, 1903................. *Printed for both distribution and sessional papers.*

**19.** Report of the Minister of Public Works, for the fiscal year ended 30th June, 1903. Presented 16th March, 1904, by Hon. J. Sutherland........... .. *Printed for both distribution and sessional papers.*

**19*a*.** Special Report of the Government Telegraph Service, compiled by the Department of Public Works. Presented 16th June, 1904, by Sir Wilfrid Laurier.
*Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 8.

**20.** Annual Report of the Department of Railways and Canals, for the fiscal year ended 30th June, 1903. Presented 12th April, 1904, by Hon. H. R. Emmerson.
*Printed for both distribution and sessional papers.*

**21.** Report of the Department of Marine and Fisheries (Marine), for the fiscal year ended 30th June, 1903. Presented 24th March, 1904, by Hon. J. R. Préfontaine.
*Printed for both distribution and sessional papers.*

**21*a*.** Fourth Annual Report of the Geographic Board of Canada, 1903.
*Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 9.

**21*b*.** List of Shipping issued by the Department of Marine and Fisheries, being a List of Vessels on the registry books of Canada, on the 31st December, 1903.
*Printed for both distribution and sessional papers.*

**22.** Report of the Department of Marine and Fisheries (Fisheries), for the fiscal year ended 30th June, 1903. Presented 6th April, 1904, by Hon. J. R. Préfontaine.
*Printed for both distribution and sessional papers.*

**23.** Report of the Harbour Commissioners, etc., 1903 ... *Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 10.

**24.** Report of the Postmaster General, for the year ended 30th June, 1903. Presented 16th March, 1904, by Sir William Mulock.......... ...... ....... ...*Printed for both distribution and sessional papers.*

**25.** Annual Report of the Department of the Interior, for the fiscal year ended 30th June, 1903. Presented 16th March, 1904, by Hon. C. Sifton.......*Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 11.

**26.** Summary Report of the Geological Survey Department for the calendar year 1903. Presented 5th July, 1904, by Sir Richard Cartwright.. .........*Printed for both distribution and sessional papers.*

**27.** Annual Report of the Department of Indian Affairs, for the fiscal year ended 30th June, 1903. Presented 8th July, 1904, by Hon. C. Sifton.... ......*Printed for both distribution and sessional papers.*

**28.** Report of the North-West Mounted Police, 1903. Presented 18th April, 1904, by Sir Wilfrid Laurier.
*Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 12.

**29.** Report of the Secretary of State of Canada, for the year ended 31st December, 1903. Presented 16th March, 1904, by Hon. J. Sutherland..............*Printed for both distribution and sessional papers.*

**30.** Civil Service List of Canada, 1903. Presented 16th March, 1904, by Sir Wilfrid Laurier.
*Printed for both distribution and sessional papers.*

**31.** Report of the Board of Civil Service Examiners, for the year ended 31st December, 1903. Presented 28th April, 1904, by Sir Wilfrid Laurier..........*Printed for both distribution and sessional papers.*

**32.** Annual Report of the Department of Public Printing and Stationery, for the year ended 30th June, 1903. Presented 28th April, 1904, by Sir Wilfrid Laurier.
*Printed for both distribution and sessional papers.*

**33.** Report of the Joint Librarians of Parliament for the year 1903. Presented 11th March, 1904, by the Hon. The Speaker.......................... .... .... .... ........*Printed for sessional papers.*

**34.** Report of the Minister of Justice as to Penitentiaries of Canada, for the year ended 30th June, 1903, Presented 11th April, 1904, by Hon. C. Fitzpatrick
*Printed for both distribution and sessional papers.*

**35.** Report of the Department of Militia and Defence of Canada, for the year ended 31st December, 1903. Presented 10th May, 1904, by Sir Frederick Borden.
*Printed for both distribution and sessional papers.*

## CONTENTS OF VOLUME 13.

**36.** Report of the Department of Labour, for the year ended 30th June, 1903. Presented 16th March, 1904, by Sir William Mulock. ....................*Printed for both distribution and sessional papers.*

**36*a*.** Evidence taken before the Royal Commission to inquire into Industrial Disputes in the province of British Columbia. Presented 15th July, 1904, by Sir William Mulock.
*Printed for both distribution and sessional papers.*

**37.** An agreement made between His Majesty the King and the Grand Trunk Pacific Railway Company, dated March 8th, 1904, varying in some respects the provisions of the agreement between His Majesty and Sir Charles Rivers Wilson and others representing the said company, a copy of which forms the Schedule to the Act, 3 Edward VII, chapter 71. Presented 11th March, 1904, by Sir Wilfrid Laurier................................*Printed for both distribution and sessional papers.*

**37*a*.** Proposed alterations to contract *re* Grand Trunk Pacific Railway Company, and correspondence in connection therewith. Presented 28th March, 1904, by Sir Wilfrid Laurier.
*Printed for both distribution and sessional papers.*

**38.** Statement of superannuations and retiring allowancss in the civil service during the year ended 31st December, 1903, showing name, rank, salary, service, allowance and cause of retirement of each person superannuated or retired, and also whether vacancy filled by promotion or by new appointment, and salary of any new appointee. Presented 16th March, 1904, by Hon. W. S. Fielding
*Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**39.** Return of over-rulings by the treasury board of the auditor general's decisions between the commencement of the session of 1903 and that of 1904. Presented 16th March, 1904, by Hon. W. S. Fielding.. ... ........ ........................................................... *Not printed.*

**40.** Statement of Governor General's Warrants issued since the last session of parliament, on account of the fiscal year 1903-1904. Presented 16th March, 1904, by Hon. W. S. Fielding. ....... *Not printed.*

**41.** Statement in pursuance of section 17 of the Civil Service Insurance Act, for the fiscal year ending 30th June, 1903. Presented 16th March, by Hon. W. S. Fielding ........ ......... *Not printed.*

**42.** Statement of receipts and expenditures of the Ottawa Improvement Commission, for the fiscal year ended 30th June, 1903. Presented 16th March, 1904, by Hon. W. S. Fielding......... *Not printed.*

**43.** Return showing the expenditure on account of unforeseen expenses from the 1st July, 1903, to the 10th March, 1904. Presented 16th March, 1904, by Hon. W. S. Fielding.. ........... *Not printed.*

**44.** Ordinances of the Yukon Territory, passed by the Yukon Council in the year 1903. Presented 17th March, 1904, by Sir Wilfrid Laurier............................... ................ *Not printed.*

**45.** Report of the Commissioner, Dominion Police Force, for the year 1903. Presented 17th March, 1904, by Hon. W. S. Fielding ........... .... ...... ....... ..... ................... .... *Not printed.*

**46.** The Award of the Alaska Boundary Tribunal. Presented 22nd March, 1904, by Sir Wilfrid Laurier. *Printed for sessional papers.*

Note.—This is included in 46*a*.

**46*a*.** Correspondence respecting the Alaska boundary, together with the award of the Alaska Boundary Tridunal. Presented 8th July, 1904, by Sir Wilfrid Laurier. *Printed for both distribution and sessional papers.*

**47.** Detailed statement of all bonds and securities registered in the Department of the Secretary of State of Canada, since last Return, 24th March, 1903, submitted to the parliament of Canada under section 23, chapter 19 of the Revised Statutes of Canada. Presented 23rd March, 1904, by Sir Wilfrid Laurier.... . ...... ..................... . ................................ *Not printed.*

**48.** Statement of the affairs of the British Canadian Loan and Investment Company, as on 31st December, 1903. Presented 21st March, 1904, by the Hon. The Speaker.................... *Not printed.*

**49.** Return to an order of the House of Commons, dated 17th March. 1904, for a copy of the Report of Mr. McLeod, C.E., upon the continuation of the Trent Valley Canal between Rice Lake and Lake Ontario. Presented 28th March, 1904.—*Mr. Blain*.... .......... .... *Printed for sessional papers.*

**49*a*.** Return to an order of the House of Commons, dated 28th March, 1904, for copies of all engineers' reports with plans and profiles, and other particulars, showing the surveys for the southern section of the Trent Valley Canal, between Rice Lake and Lake Ontario, by the two routes, via Trenton and Port Hope ; and the comparative cost by each route. Presented 2nd May, 1904.—*Mr. Blain*..*Not printed.*

**50.** Return of orders in council which have been published in the *Canada Gazette* between 1st January and 31st December, 1903, in accordance with the provisions of section 52 of the North-west Irrigation Act, chapter 35 of 61 Victoria. Presented 30th March, 1904, by Hon. C. Sifton. .. ...*Not printed.*

**51.** Return of orders in council which have been published in the *Canada Gazette* and in the *British Columbia Gazette*, between 1st January and 31st December, 1903, in accordance with the provisions of subsection *(d)* of section 38 of the regulations for the survey, administration, disposal and management of Dominion lands within the 40-mile railway belt in the province of British Columbia. Presented 30th March, 1904, by Hon. C. Sifton ................ ... .... .. . ........ . *Not printed.*

**52.** Return of orders in council which have been published in the *Canada Gazette* between 1st January and 31st December, 1903, in accordance with the provisions of clause 91 of the Dominion Lands Act, chapter 54 of the Revised Statutes of Canada, and its amendments. Presented 30th March, 1904, by Hon. C. Sifton .... .. .. ....... ............ .... .. .. .. ... . ......*Not printed.*

**53.** Return (in so far as the Department of the Interior is concerned) of copies of all orders in council, plans, papers and correspondence which are required to be presented to the House of Commons, under a resolution passed on 20th February, 1882, since the date of the last return under such resolution. Presented 30th March, 1904, by Hon. C. Sifton ........... .......... .... *Not printed.*

**54.** Return to an order of the House of Commons, dated 28th March, 1904, showing amount of rebates of duties paid on agricultural implements from June 30th, 1901, to June 30th, 1903, to each firm exporting such machinery for the respective years. Presented 11th April, 1904.—*Mr. Roche (Marquette)* .... ................... ........ .... .......... ........... . . ....*Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**55.** Return showing remissions of interest made under section 141, as added to the Indian Act by section 8, chapter 35, 58-59 Victoria, for the year ended 30th June, 1903. Presented 11th April, 1904, by Hon. C. Sifton.................................................................*Not printed.*

**56.** Return of all lands sold by the Canadian Pacific Railway Company, from the 1st of October, 1902, to the 1st October, 1903. Presented 11th April, 1904, by Hon. C. Sifton.....................*Not printed.*

**57.** Return to an order of the House of Commons, dated 28th March, 1904, for copies of all correspondence since January 1st, 1904, between the postmaster general and the mayor of the town of Walkerton, relating to the irregularity of the mail service to the Town of Walkerton. Presented 11th April, 1904.—*Mr. Donnelly*.........................................*Not printed.*

**58.** Return of the names and salaries of all persons appointed to or promoted in the several department of the civil service, during the calendar year 1903. Presented 13th April, 1904, by Hon. W. S. Fielding..........................................................*Not printed.*

**59.** Orders of the Exchequer Court, under provisions of section 55 of 50-51 Victoria, as amended by 52 Victoria, chapter 8. Presented 13th April, 1904, by Hon. C. Fitzpatrick.............*Not printed.*

**60.** Return to an order of the House of Commons, dated 28th March, 1904, for copies of all correspondence, petitions and papers, between any settlers in township 27, ranges 31 and 32, and township 28, ranges 31 and 32, and any department of the government, in reference to adding of those townships to the Doukhobor reserve. Presented 14th April, 1904.—*Mr. Roche (Marquette)*..........*Not printed.*

**61.** Return to an order of the House of Commons, dated 17th March, 1904, for copies of all correspondence in connection with the cutting of any timber on Hope Island, in the Georgian Bay, by any person or persons during the years 1903-4. Presented 14th April, 1904.—*Mr. Bennett*.........*Not printed.*

**61*a*.** Supplementary return to 61. Presented 28th April, 1904.............................*Not printed.*

**62.** Copy of order in council respecting shipment of Canadian goods in Untied States vessels via St. Michaels, with regulations and instructions issued in 1898 and subsequent years, and also correspondence respecting the issue of orders and instructions for the season of 1904. Presented 19th April, 1904, by Hon. W. Paterson.........................................*Printed for sessional papers.*

**63.** Extract from a report of the committee of the honourable the privy council, approved by the governor general on the 11th March, 1904, respecting the management and control of public and other works (3 Edward VII., c. 53), provides for the transfer by the governor in council of the management, charge and direction of any public works, or any power, duty or function with respect to any work or class of works, whether public or private, which is assigned to or vested by statute in any minister or department, to any other minister or department. Presented 20th April, 1904, by Sir Wilfrid Laurier...........................................................*Printed for sessional papers.*

**64.** Return to an order of the House of Commons, dated 17th March, 1904, showing the names and number of the officials in the employ of government in Canada in connection with immigration; the salaries of each; the amount of money spent in Canada in connection with immigration; the total expenditure in connection with immigration, for the fiscal year ending 30th June, 1903; the expenditure for advertising; and the amount of expenditure on buildings, with names of places. Presented 20th April, 1904.—*Mr. Wilson*...........................................*Printed for sessional papers.*

**64*a*.** Return to an order of the House of Commons, dated 17th March, 1904, showing the names and number of all the immigration agents employed on commission by the Dominion government in Great Britain and Ireland, and in Europe, specifying the countries; also the United States. Also how much commission is paid for each immigrant to each agent; how many immigrants have been sent to Canada by each agent; how much money has been paid to each agent as commission; and how much has been allowed to each agent for expenses from 30th June, 1902, to 1st January, 1904. Presented 20th April, 1904.—*Mr. Wilson*.....................................*Printed for sessional papers*

**64*b*.** Return to an order of the House of Commons, dated 17th March, 1904, showing the names and number of all immigration agents employed on salary by the Dominion government from the 30th June, 1902, to 1st January, 1904, in Great Britain and Ireland, the United States of America and Europe; the salary paid to each agent, the amount allowed for expenses to each. Also the number of immigrants sent to Canada by each of the said agents. Presented 22nd April, 1904.—*Mr. Wilson*.
*Printed for sessional papers.*

## CONTENTS OF VOLUME 13—*Continued.*

**65.** Return to an Order of the House of Commons, dated 17th March, 1904, for copies of all thermograph records of temperature taken on board Atlantic steamships since January 1st, 1903, stating:—1. Name of steamship. 2. Date when thermograph was put in chamber. 3. Date when steamer left the port. 4. Whether chamber was (*a*) cold storage; (*b*) cool air; (*c*) mechanically ventilated; (*d*) ordinary or whether the record was taken on deck, or other place where the natural temperature of the air would be registered, unexposed to the sun's rays. 5. Where practicable, in what part of the chamber the thermograph was placed. Presented 20th April, 1904.—*Mr. Smith* (*Wentworth*). *Not printed.*

**65*a*.** Return to an order of the House of Commons, dated 17th March, 1904, for copies of all correspondence to date between the department of agriculture and the steamship companies, in regard to mechanical ventilation of ships' holds. Presented 22nd April, 1904.—*Mr. Smith* (*Wentworth*). *Not printed.*

**66.** Return to an order of the House of Commons, dated 28th March, 1904, showing:—1. The number of timber limits, and where located, that have been disposed of by the government since March 15, 1902, in the province of Manitoba and the North-west Territories. 2. The names of the purchasers in each case, and the price paid for each limit. 3. Copies of tender for each limit, and the names of the newspapers in which the advertisements appeared. Presented 22nd April, 1904.—*Mr. Roche* (*Marquette*)........................................................................*Not printed.*

**66*a*.** Return to an order of the House of Commons, dated 17th March, 1904, showing the number of timber limits granted in Manitoba and the North-west Territories, between the years 1878 and 1896, inclusive; and the mileage covered by said limits, together with the amount of money per mile received by the government for said timber limits. Also the number of limits that have been granted since the present government came into power, and the amount received per mile for the same. Presented 22nd April, 1904.—*Mr. McCreary*.................................*Not printed.*

**67.** Return to an address of the House of Commons, dated 17th March, 1904, for copies of all petitions, memorials and correspondence respecting the half-breed allotment of scrip in Manitoba and the Territories up to date. Also copies of all reports and orders in council in connection therewith. Presented 22nd April, 1904.—*Mr. LaRivière*.......................................*Not printed.*

**67*a*.** Return to an order of the House of Commons, dated 25th April, 1904, of all petitions, letters and other correspondence between the half-breeds of the Saskatchewan district and the Dominion government, relating in any way to the grievances of the said half-breeds, for the years 1883, 1884 and 1885. Also all correspondence between the Dominion government and their officials and others in the district of Saskatchewan, previous to the rebellion of 1885, relating in any way to the grievances of the said half-breeds. Presented 31st May, 1904.—*Mr. McCreary*..............*Not printed.*

**67*b*.** Supplementary return to 67. Presented 31st May, 1904. ........................*Not printed.*

**67*c*.** Return to an order of the House of Commons, dated 25th April, 1904, of all letters, petitions and correspondence between D. H. McDowel, Esq., M.P., and the government, relating to the payment of rebellion claims and the issue of half-breed scrip in the Saskatchewan district. Presented 10th June, 1904.—*Mr. McCreary*..........................................*Not Printed.*

**67*d*.** Return to an order of the House of Commons, dated 25th April, 1904, showing: 1. The number of allotments of 240 acres of land made to half-breeds in Manitoba, and the total acreage covered by the same. 2. The number of scrip to half-breed children in Manitoba, and the total face value of the same. 3. The number of scrip to heads of half-breed families in Manitoba, and the total face value of the same. 4. The number of scrip to original white settlers in Manitoba, and the total face value of the same. 5. The number of scrip issued in commutation of hay privileges in Manitoba, and the total face value of the same. 6. Scrip and land warrants issued for military services. 7. Scrip issued to the North-west Mounted Police. 8. Scrip issued to colonization companies; names of companies, and the face value of such scrip. 9. All other scrip issued by the department of interior; to whom, for what purpose; and respective face value of the same. 10. Number of each cash and land scrip issued to the North-west half-breeds. 11. Number and face value of all the above-described scrip outstanding on the 31st December, 1903. Presented 13th July, 1904.—*Mr. LaRivière*..................................................................*Not Printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**68.** Return to an order of the House of Commons, dated 28th March, 1904, for copies of all correspondence and agreements to date, between the government of Canada and any railway companies, in regard to ventilation of railway cars. Presented 22nd April, 1904.—*Mr. Smith (Wentworth).* *Not Printed.*

**69.** Return to an address of the Senate, dated 14th April, 1904, showing for the years 1891 to 1904, both inclusive, in detail, drawn off under separate headings: 1. Income in Canada. 2. Expenditure or disbursements in Canada, in detail. 3. Premium note account in Canada, in detail. 4. Miscellaneous in Canada, in detail. 5. Exhibit of policies in Canada, in detail. 6. Details of termination in Canada, in detail. 7. General business statement for years 1891 to 1904, both inclusive. A. Income in detail. B. Disbursements, in detail. C. Ledger assets, in detail. D. Non-ledger assets, in detail. E. Liabilities, in detail. F. Exhibits of policies. These to be drawn on under different headings as to the detail of each statement, and additions to be made, as far as it applies, to figures for the years named. Company—Mutual Reserve Life Association, formerly known as the Mutual Reserve Fund Life Association. Also for the last return made by this company to the insurance department at Ottawa in the year 1904. Presented (Senate) 21st April, 1904.—*Hon. Mr. Domville.* *Not Printed.*

**70.** Return to an address of the House of Commons, dated 28th March, 1904, for copies of all correspondence had with the government of Canada respecting the amalgamation of the South Shore, United Counties, and East Richelieu Valley Railways, or any of them; of any orders in council relating to the said amalgamation, and of all correspondence referring to the appointment of a receiver to the South Shore Railway Company. Presented 25th April, 1904.—*Mr. Monk*..... .. ... *Not Printed.*

**71.** Return to an order of the House of Commons, dated 17th March, 1904, for copies of all agreements made since January the first, 1903, between the government of Canada and any transalantic steamship companies receiving a bonus or subsidy from the government of Canada. Presented 26th April, 1904.—*Mr. Smith (Wentworth)*.. .... .......... .. ..... ............*Not Printed.*

**72.** Return to an order of the House of Commons, dated 17th March, 1904, for copies of all correspondence, petitions and other documents in possession of the government, with reference to the charges against and the dismissal of L. L. Gallagher, postmaster at Wilton, in the riding of Lennox, in the province of Ontario. Presented 29th April, 1904.—*Mr. Wilson* .... ............ .......*Not printed.*

**73.** Return to an address of the Senate, dated 6th October, 1903, for all communications between the government of Canada, or any member thereof, and the Anglo-American Telegraph Company, any other telegraph company, the Provincial Government of Prince Edward Island, any Board of Trade in Prince Edward Island or any other province, and any representative of Prince Edward Island in the House of Commons, respecting the improvement of the telegraph service between Prince Edward Island and the mainland of the Dominion. Presented (Senate) 27th April, 1904.—*Hon. Mr. Ferguson*.... .... .... ..................... ....... .. ... ................*Not printed.*

**73*a*.** Supplementary return to an address of the Senate, dated 6th October, 1903, for all communications, between the government of Canada, or any member thereof, and the Anglo-American Telegraph Company, any other telegraph company, the Provincial Government of Prince Edward Island, any Board of Trade in Prince Edward Island, or any other province, and any representative of Prince Edward Island in the House of Commons, respecting the improvement of the telegraph service between Prince Edward Island and the mainland of the Dominion; and also a copy of any contract existing between the Prince Edward Island Railway and the Anglo-American Telegraph Company, regarding the use of the lines and offices of the said railway for telegraphic purposes. Presented (Senate) 31st May, 1904.—*Hon. Mr. Ferguson*............ .. ............ ....... ...*Not printed.*

**74.** Copy of an Indenture made the 29th day of July, 1903; between the Canadian Northern Railway Company and His Majesty the King, represented by the Honourable the Minister of Finance and Receiver General of Canada. Presented 2nd May, 1904, by Hon. W. S. Fielding......*Not printed.*

**75.** Return to an order of the House of Commons, dated 25th April, 1904, for a copy of the contract between the government of Canada and the Manchester liners, in force during the season of 1903. Presented 2nd May, 1904.—*Mr. Lancaster*...... ... ....... .. . ..................*Not printed.*

**76.** Return to an order of the House of Commons, dated 25th April, 1904, for copies of all petitions, memorials, letters and other correspondence, between the Maritime Board of Trade, the Charlottetown Board of Trade, the Alberton and West Prince Board ofTrade, and the Goverment, with regard to a subsidy for a line of steamships to ply between Chatham, New Brunswick: Alberto and New London, on the north shore of Prince Edward Island; Sydney, Nova Scotia; the Magdalen Islands, and St. John's, Newfoundland. Presented 2nd May, 1904.—*Mr. Hackett*.*Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**77.** Return to an order of the House of Commons, dated 17th March, 1904, for copies of all correspondence, petitions, claims, and other documents, in the possession of the government, relating to the damages sustained by the farmers of the counties of St. John and Iberville and Missisquoi, by the floods in Richelieu River. Presented 3rd May, 1904.—*Mr. Demers (St. John and Iberville)* .....*Not printed.*

**78.** Return to an order of the House of Commons, dated 17th March. 1904, showing the amount of money expended by the Dominion government on improving the navigation on the Saskatchewan River, in the North-west Territories Presented 3rd May, 1904.—*Mr. McCreary.* .... *Not printed.*

**79.** Return to an order of the House of Commons, dated 17th March, 1904, for copies of all correspondence since the first of March, 1903, including, reports, letters, telegrams, etc., between the government of Canada and any of its officers, or engnieers, or other persons, respecting the damage being done to the island at Toronto by the waters of Lake Ontario; also copies of any orders or instructions which have been issued respecting the works necessary or to be undertaken for the protection of the said island, and the preservation of Toronto harbour. Presented 3rd May, 1904.—*Mr. Osler.* *Not printed.*

**80.** Return to an order of of the House of Commons, dated 23rd March, 1904, showing the names of all persons employed on the Bronte harbour improvements, in connection with the construction or repair of the pier, during the year ending 30th June, 1901, as foreman, timekeeper, labourers, or workmen of any kind. Also the several amounts paid as wages to each of such persons. And a similar return giving the like information for each of the years ending 30th June, 1902 and 1903; and for the six months ending January 1st, 1904, respectively. Presented 3rd May, 1904.—*Mr. Henderson.* ................*Not printed.*

**81.** Return to an order of the House of Commons, dated 25th April, 1904, for copies of all letters, telegrams, correspondence, petitions, memorials, documents and papers, relating to the recent appointment of Mr. Boyd to be postmaster at the village of Huntingdon, in the province of Quebec; or relating to the filling of the vacancy occasioned by the death of the late postmaster. Presented 3rd May, 1904.—*Mr. Borden (Halifax).* ......*Not printed.*

**82.** Return to an order of the House of Commons, dated 25th April, 1904, for copies of all documents, memorials, petitions, reports and correspondence, in relation to the removal of the post office at Ossekeag, or Hampton Station, in King's County, N. B., from the railway station to the store of R. H. Smith. Presented 3rd May, 1904.—*Mr. Hughes (Victoria).* ... *Not printed.*

**83.** Return to an order of the House of Commons, dated 28th March, 1904, showing the present indebtedness of the Montreal Turnpike Trust to the Dominion government; and the sums received by the latter as interest on bonds of said trust since 1895. Presented 3rd May, 1904.—*Mr. Monk.* *Not printed.*

**84.** Return to an order of the House of Commons, dated 25th April, 1904, showing: 1. The quantity and value of raw cotton imported into Canada during each of the past six years; also exports of same, if any, during same term. 2. From what countries it was imported, and the amount and value from each country. 3. The quantity and quality of manufactured cotton imported into Canada during each of the past six years. 4. From what countries it was imported, and the amount in value from each country. 5. The quantity and value of manufactured cotton exported from Canada during each of the past six years. 6. To what countries it was exported. Presented 4th May, 1904.—*Mr. Thompson (Haldimand and Monck)* .....*Not printed.*

**85.** Return to an order of the House of Commons, dated 30th March, 1904, for: 1. Copies of the investigation held in February last, in Quebec, by the special tribunal appointed to inquire into the complaint laid by Lt.-Colonel Evanturel, commander of the 9th regiment of the active militia, against Major Ouellet, of the said regiment. 2. Of the recommendation of the commandant of the 7th military district, to the effect that the said Lt.-Colonel Evanturel be continued for a second term in the command of the said 9th regiment. 3. Of all correspondence relating to the said second prolongation of the said Lt.-Colonel Evanturel's term of command or relating to the said investigation. Presented 4th May, 1904.—*Mr. Casgrain* ....*Not printed.*

**85*a*.** Supplementary return to No. 85. Presented 15th June, 1904 ....*Not printed.*

**86.** Return to an address of the House of Commons, dated 28th March, 1904, for copies of all letters, telegrams, communications in writing and correspondence. between the government. or any department of the government, or any minister, deputy ministers, officers or other persons acting for the government, and the Vancouver Engineering Works, Limited, or any official or other person acting for the

## CONTENTS OF VOLUME 13—*Continued.*

said company, respecting the enlargement of dry dock facilities on the Pacific coast. 2. All letters, telegrams, communications in writing, and correspondence between the government, or any department of the government, especially the department of public works, and the department of marine and fisheries, and N. Thompson & Company, or any member of that firm, D. G. McDonell, F. Burnett, R. Kelly, R. G. McPherson, and C. G. Johnson, or either of them, respecting the enlargement of dry dock facilities on the Pacific coast. 3. All letters, telegrams, communications in writing, and correspondence between the government, or any department of the government, or any officer acting or purporting to act for the government, and any persons whomsoever, respecting the enlargement of the dry dock facilities on the Pacific coast, or the establishment of a dry dock, or dry docks, on that coast. 4. All orders in council and other documents whatsoever respecting the matters aforesaid, or any of them. Presented 4th May, 1904. *Mr. Haggart* .... ................*Not printed.*

**87.** (1). Return to an order of the House of Commons, dated 28th March, 1904, for copies of all reports, opinion, letters, and correspondence, written, sent, given or transmitted to the government, or any department or any minister, by P. V. Savard, Esq., from the date of his appointment, 14th May, 1903, (See *Hansard*, unrevised, 1904, page 235) to the 10th March 1904, in relation to the investigation held or made by the said P. V. Savard, Esq., into the question as to how the local government of Quebec acquired the Mingan Seigniory, and what title to the property existed in the province prior to its conveyance to the Labrador Company (See *Hansard*, 1904, unrevised, page 230). Presented 5th May, 1904.—*Mr. Casgrain*..................*Not printed.*

**87.** (2). Return to an address of the House of Commons, dated 17th March, 1904, for copies of all orders in council, ministerial orders, or other documents appointing Mr. P. V. Savard, advocate, formerly a member of this house, to a position under the government, during the course of the years 1902, 1903, or 1904; of all correspondence relating to such appointment; and of all detailed accounts, memoranda, etc., for salary and fees as well for travelling expenses and all other expenses presented by the said P. V. Savard; and statements showing how much has been claimed by the said P. V. Savard, for such salary and expenses, and how much has been paid to him. Presented 5th May, 1904.—*Mr. Taylor*..................*Not printed.*

**88.** Return to an order of the House of Commons, dated 25th April, 1904, giving names of all delegates sent by the government from Canada to Great Britain and Ireland, or any European country, during the year 1903; with the amount paid to each delegate by way of salary and expenses; and the nature of the duties performed by each delegate; giving districts where those duties were performed. Presented 6th May, 1904.—*Mr. Roche (Marquette)*..................*Not printed.*

**89.** Return to address of the House of Commons, dated 24th March, 1904, for copies of all contracts entered into between the government of Canada and any corporation, company or person, during the past five years for the carriage of mails between any port or ports on the St. Lawrence and the United Kingdom; and copies of all such contracts for the carriage of mails, during the period aforesaid, between any port or ports in Nova Scotia or New Brunswick and the United Kingdom. Presented 9th May, 1904.—*Mr. Haggart*..................*Not printed.*

**90.** Return to an address of the House of Commons, dated 25th April, 1904, for copies of orders in council, departmental orders, or letters, defining the respective duties of the chief engineer of the department of marine and fisheries, and of the Commissioner of Lights. Presented 10th May, 1904.—*Mr. Lancaster*..................*Not printed.*

**91.** Return to an address of the House of Commons, dated 9th May, 1904, for copies of all orders in council, patents, deeds, documents, correspondence and papers, passed, executed, signed, delivered, sent or received, since the first of July, 1903, in connection with the grant of any land in the city of Quebec to the Ross Rifle Factory Company, or Sir Charles Ross, or any person or persons on behalf of or acting for the said Sir Charles Ross or the said company. Presented 26th May, 1904.—*Mr. Bell*..................*Not printed.*

**92.** Return to an order of the House of Commons, dated 9th May, 1904, for a statement showing in detail the quantity of vegetables and fruits imported from the United States and entered at the ports of Montreal and Toronto, during the years 1902 and 1903, respectively; as well as of the amount of duties collected by the government during the said two years at each one of said ports, and indicating separately the quantities and amounts for the first six months in each year. Presented 26th May, 1904.—*Mr. Monk*..................*Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**93.** Return to an order of the House of Commons, dated 9th May, 1904, for copies of all correspondence, letters, telegrams, petitions or other documents, from January 1st, 1901, to the present time, in connection with or in relation to the dismissal of E. A. Nash, formerly Dominion lands agent at Kamloops, B.C. ; and all correspondence, letters, telegrams or other documents in relation to his application for superannuation. Presented 26th May, 1904.—*Mr. Taylor*............ *Not printed.*

**94.** Return to an order of the House of Commons, dated 9th May, 1904, for a copy of the report of Blaise Dugas, who was sent to Belgium in connection with increasing the facilities of the tobacco trade with that country, during the year 1902. Presented 27th May, 1904.—*Mr. Monk*......*Not printed.*

**95.** Return to an order of the House of Commons, dated 9th May, 1904, showing : 1. The total expenditure in connection with the cheese-cooling rooms at Brockville and Woodstock, Ontario, up to the first of March, 1904, detailed as follows : 2. The cost of site for curing room. 3. The cost of construction of buildings. 4. The cost of machinery, fittings, etc. 5. The cost of cheese purchased. 6. The cost of hauling cheese. 7. The salaries of officials, labour, travelling expenses, etc. 8. The cost of cheese boxes, chemicals, light, telephone, cold storage, freight, and all other incidentals. 9. The amount received for sale of cheese. 10. The amount received for curing cheese. Presented 27th May, 1904.—*Mr. Taylor* ......... .... ..... ........................... ......... *Not printed.*

**95a.** Return to an order of the House of Commons, dated 9th May, 1904, showing : 1. The total expenditure in connection with the cheese-cooling room at St. Hyacinthe, Quebec, up to the first of March, 1904, detailed as follows : 2. The cost of site for curing room. 3. The cost of construction of buildings. 4. The cost of machinery, fittings, etc. 5. The cost of cheese purchased. 6. The cost of hauling cheese. 7. The salaries of officials, labour, travelling expenses, etc. 8. The cost of cheese boxes, chemicals, light, telephone, cold storage, freight, and all other incidentals. 9. The amount received for sale of cheese. 10. The amount received for curing cheese. Presented 27th May, 1904.—*Mr. Taylor*. ............. ................................................................*Not printed.*

**95b.** Return to an order of the House of Commons, dated 9th May, 1904, showing : 1. The total expenditure in connection with the cheese-cooling room in Cowansville, Quebec, up to the first of March, 1904, detailed as follows : 2. The cost of site of curing-room. 3. The cost of construction of buildings. 4. The cost of machinery, fittings, etc. 5. The cost of cheese purchased. 6. The cost of hauling cheese. 7. The salaries of officials, labour, travelling expenses, etc. 8. The cost of cheese boxes, chemicals, light, telephone, cold storage, freight, and all other incidentals. 9. The amount received for sale of cheese. 10. The amount received for curing cheese. Presented 27th May, 1904.—*Mr. Taylor.* *Not printed.*

**96.** Return to an address of the House of Commons, dated 17th March, 1904, for copies of all correspondence respecting the sale, lease or rental of the Garrison Common to the city of Toronto, or to any private parties ; and also as to the acquirement of the land to be used by the permanent military forces ; together with all orders in council disposing of said Garrison Common, and acquiring the lands to be used for military purposes. Presented 30th May, 1904.—*Mr. Clarke.* .... *Not printed.*

**97.** Return to an address of the House of Commons, dated 28th March, 1904, for copies of all orders of council, and of all other documents and correspondence relating to the appointment of a commissioner to investigate the condition of the lobster and other Atlantic coast fisheries ; likewise of the instructions given regarding that subject : also the reports that may have been made thereon. Presented 30th May, 1904.—*Mr. Ganong*.......................... ... ............*Not printed.*

**98.** Return to an address of the House of Commons, dated 9th May, 1904, for copies of all correspondence representations, minutes, or orders in council, appointments, instructions, papers and writings, in reference to, or in connection with, railway cattle-guards ; or in reference to, or in connection with, the selection or appointment of the cattle-guard commission, and the members thereof ; and their actions and proceedings, including the retirement of Mr. Robertson, and the appointment of Mr. F. W. Holt, C.E., as sole commissioner ; and his instructions and subsequent proceedings ; and including all interim, partial and final reports by the original or subsequent commission, between the date of the report of railway committee of the session of 1902 on the Lancaster Bill No. 3, of that session, and this date. Presented 30th May, 1904.—*Mr. Clare*.......................... ......... *Not printed.*

**99.** Return to an order of the House of Commons, dated 28th March, 1904, of the judgment and decision of the board of railway commissioners in the application of the towns of Port Arthur and Fort William for telephonic communication with stations and premises of the Canadian Pacific Railway. Presented 30th May, 1904.—*Mr. Sproule*.................... ..........................*Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**100.** Return to an order of the House of Commons, dated 9th May, 1904, for copies of all letters, correspondence, memorials, petitions and documents, in the possession of the Government, relating to the employment, or requesting the employment, by the Grand Trunk Railway Company, or by the Grand Trunk Pacific Railway Company, of British subjects as engineers in the surveying and construction of the proposed National Transcontinental Railway; and generally, all correspondence and documents in the possession of the government, in any way complaining of, or protesting against, the employment of aliens as engineers in railway surveying or construction on the line of the proposed National Transcontinental Railway. Presented 30th May, 1904.—*Mr. Taylor*.........*Not printed.*

**101.** Return to an order of the House of Commons dated 9th May, 1904, for copies of all correspondence between the post office department any any person, or persons, referring to the change in postmasters in charge of the post office at Irena, in the township of Matilda, in the county of Dundas. Presented 31st May, 1904.—*Mr. Taylor*..........*Not printed.*

**102.** Copy of the order in council appointing His Honour Judge Winchester, commissioner, to ascertain the names, nationality, nature and time of employment, remuneration and actual *bona fide* residence at the time of employment, of each person heretofore or at present employed in connection with the surveys of the proposed Grand Trunk Pacific Railway; and also as to the names of all the Canadians or *bona fide* residents of Canada, who have made application for such employment, the nature of the employment applied for, and the result of such application, etc. Presented 31st May, 1904, by Sir William Mulock..........*Not printed.*

**103.** Return of application for registration, under the provisions of chapter 131 (R.S.C.) intituled: "An Act respecting Trade Unions." Presented 1st June, 1904, by Hon. W. S. Fielding. *Not printed.*

**104.** Return to an order of the House of Commons, dated 25th April, 1904, giving details with regard to the actual cost of construction of the Belfast and Murray Harbour branches of the Prince Edward Island Railway between Southport and Murray River, as follows: Miles clearing, and cost per mile, miles close cutting, and cost per mile; miles grubbing, and cost per mile; cubic yards solid rock excavated, rate per yard, and cost per mile; ditching rate per yard, and cost per mile; cubic yards borrowed, rate per yard and cost per mile; public crossings, cost per mile; farm crossings, cost per mile; ballast, cost per mile; fencing, cost per mile; rail fastenings, cost per mile; beam culverts, cost per mile; length of sidings in feet, and cost of same; stations, where placed, and cost of each; miles of track-laying, and cost per mile; three-foot iron pipes, how many, and cost per mile; eighteen-inch vitrified clay pipes, and cost per mile; steel trestles, length of same, and cost per mile; total cost of work to date; description and size of engine-house and turn-table; also capacity of water-tank, and where situated. Presented 6th June, 1904.—*Mr. Hackett*...*Not printed.*

**104*a*.** Return to an address of the Senate, dated 31st May, 1904, giving statements in detail of the expenditures on Hillsborough Bridge and Murray Harbour Branch Railway, Prince Edward Island, contained in an amount of $1,492,525.47 stated by the minister of finance in the House of Commons on the 30th of September, 1903, to have been expended on these two works up to the 30th June, 1903. And also similar statements regarding any other expenditures, if any, up to the last mentioned date, on these works, not included in the amount so stated by the Finance Minster: 1 Expenditure on Murray Harbour Branch Railway for—(*a*) Surveys. (*b*) Legal expenses, names of persons to whom paid, and amount of each. (*c*) Land damages, names of persons to whom paid, and amount of each. (*d*) Grading and blasting. (*e*) Track-laying. (*f*) Fencing. (*g*) Equipment. (*h*) Any other expenditure, if any, not included in these headings, to make up the total expenditure up to June 30, 1903. 2. Expenditure on Hillsborough Bridge for—(*a*) Surveys. (*b*) Legal expenses, to whom paid, and amount to each. (*c*) Approaches, including land damages, to whom paid, and amount to each. (*d*) Substructures. (*e*) Superstructures. (*f* Track-laying for railway and general traffic. (*g*) Any other expenditures, if any, for the same period, not included under above headings. 3. A detailed statement, as above, showing the expenditure, up to the date of the passing of this address, of the whole or part of the amount of $1,230,000 voted for the said bridge and railway for the current year. 4. A detailed statement, as in Nos. 1 and 2, showing the estimated application of any part of the said $1,230,000, voted last session for the said railway and bridge and unexpended at the date of the passing of this address. Statements regarding railway and bridge to be given separately. Presented 26th July, 904.—*Hon. Sir Mackenzie Bowell*..........*Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**104*b*.** Return to an order of the House of Commons, dated 30th May, 1904, giving a statement in detail of the expenditures on Hillsborough Bridge, Prince Edward Island, and Murray Harbour Branch Railway, Prince Edward Island, contained in an amount of $1,492,525.47, stated by the minister of finance, in *Hansard* of 1903, page 12829, to have been expended on these two works up to 30th June, 1903: Expenditure on Murray Harbour Branch: (*a*) surveys; (*b*) legal expenses, names of persons to whom paid, and amount to each; (*c*) land damages, names of persons to whom paid, and amount to each; (*d*) grading and ballasting; (*e*) track-laying; (*f*) fencing; (*g*) equipment; and any other expenditure under other headings to make up the total expenditure to June 30th, 1903. Expenditure on Hillsborough Bridge: (*a*) surveys; (*b*) cost of approaches, giving land damages, and to whom paid; (*c*) cost of subtructures; (*d*) cost of superstructures; (*e*) legal expenses, to whom paid and amount to each. And also a detailed statement as above, showing the application of the sum of $1,230,000. mentioned by the minister of finance in *Hansard*, 1903, page 12829, to be expended; statements on railway and bridge separately. Presented 4th August, 1904.—*Mr. Lefurgey.*
*Not printed.*

**105.** Return to an address of the House of Commons, dated 9th May, 1904, for copies of all orders in council, documents, correspondence exchanged between the government, or any of the ministers, and any persons, regarding the Indian reserve established by 14 and 15 Victoria, chapter 106, in favour of the Iroquois Indians of Sault St. Louis and of the Lake of Two Mountains, and the exchange of that reserve for any other one or for any sum of money in favour of the said Indians. Presented 10th June, 1904.—*Mr. Léonard* .......................................... *Not printed.*

**106.** Return to an address of the Senate, dated 25th April, 1904, showing the earnings and expenses of operating the Pacific cable since its opening for business: 1. The number of words transmitted each way, distinguishing ordinary messages from government and press messages. 2. The gross earnings each month. 3. The total expenses incurred each month—(*a*) in repairs; (*b*) in maintenance; (*c*) in interest; (*d*) in sinking fund; (*e*) in salaries. Together with copies of all correspondence relating to any difficulties which may have arisen in Australia in connection with the working and operation of said Pacific cable. Presented (Senate) 20th May, 1904.—*Hon. Sir Mackenzie Bowell.*
*Not printed.*

**107.** Return to an address of the Senate, dated 21st April, 1904, for copies of all correspondence and recommendations which led to the appointment of J. B. Jackson to the position of commercial agent to Leeds and Hull, England, at a salary of three thousand dollars per annum, and office and contingent expenses. Presented (Senate) 20th May, 1904.—*Hon. Sir Mackenzie Bowell.*
*Not printed*

**107*a*.** Return to an address of the Senate, dated 1st June, 1904, for a copy of the recommendation made to the executive council upon which an order was passed appointing J. B. Jackson a commercial agent in England, together with a copy of said order authorizing said appointment. Presented (Senate) 7th June, 1904.—*Hon. Sir Mackenzie Bowell* ........................ *Not printed.*

**108.** Return to an address of the Senate, dated 20th April, 1904, of copies of geological or other reports in the hands of the government, bearing upon the question of coal or other fuel supply in the provinces of Quebec, Ontario, or Manitoba, with the view of devising some measure of relief from our present position. Presented (Senate) 20th May, 1904.—*Hon. Mr. McMullen* ......... *Not printed*

**109.** Return to an address of the Senate, dated 14th April, 1904, showing: 1. Imports of aluminum in pigs or ingots into Canada. 2. Aluminum metal manufactured in any form. 3. Oxide o aluminum. 4. Alumina. 5. Quantities by weight values. 6. Countries imported from, and ports of entry in Canada, and what countries the production of. 7. Exports of aluminum in pigs or ingots. 8. Aluminum metal manufactured in any form. 9. What countries exported to, and ports of shipment in Canada. 10. Quantities by weight values. 11. For the years 1901, 1902, and 1903. Presented (Senate) 20th May, 1904. *Hon. Mr. Domville* ................................ *Not printed.*

**110.** Return to an address of the Senate, dated 8th October, 1903, for a statement showing the amount of premiums of insurance against fire which have been paid each year in the city of Montreal during the last ten years, up to the 1st of July last, and also showing the amounts paid each year at Montreal during the same period by insurance companies to holders of policies, and also the names of these companies. Presented (Senate) 22nd April, 1904.—*Hon. Mr. David.*
*Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**111.** Return to an order of the House of Commons, dated 25th April, 1904, showing the number of liquor permits issued for the Yukon Territory since the date of the last return; the names of parties to whom said permits were issued; the quantities of liquor covered by each permit; the names of all parties to whom said permits were assigned (if assigned) by the original permit-holder. Presented 9th June, 1904.—*Mr. Lancaster*.......... *Not printed.*

**112.** Return to an order of the House of Commons, dated 30th May, 1904, for copies of the letters of of resignation of the following officers of the 9th regiment of the active militia, addressed to Lt.-Colonel Evanturel: Majors Routhier and Ouellet; Captains Chabot, Belleau, Matte, Dessaint, P. T. Trudel and J. R. Trudel; Lieutenants Edm. Trudel, J. A. Beaulieu, F. H. Hallé and A. Grenier; and all correspondence between these officers and the department of militia regarding the said resignations. Presented 15th June, 1904.—*Mr. Casgrain*.......... *Not printed.*

**113.** Copies of the order in council appointing Major General, the Earl Dundonald, to the command of the Canadian militia, 20th May, 1902, and the order in council relieving from the command of the Canadian militia, 14th June, 1904, and also correspondence and other papers connected therewith. Presented 15th June, 1904, by Sir Wilfrid Laurier. Further correspondence presented 16th June, 1904, by Hon. W. S. Fielding. Also on 22nd June, 1904, by Hon. S. A. Fisher.

*Printed for both distribution and sessional papers.*

**113*a*.** Further papers in connection with the removal of Major General the Earl of Dundonald from the command of the Canadian militia. Presented 29th June, 1904, by Sir Frederick Borden.

*Printed for both distribution and sessional papers.*

**114.** Return to an order of the House of Commons, dated 1st June, 1904, for a copy of all statements, documents and papers showing how much the government has received annually from the Quebec Central Railway Company from 1896 to 31st December, 1903: (*a*) for the passage of its trains over the Intercolonial from Harlaka to Lévis; (*b*) for the storage of its freight; (*c*) for water supplies; (*d*) for any other services. Presented 16th June, 1904.—*Mr. Morin*.......... *Not printed.*

**115.** Return to an order of the House of Commons, dated 1st June, 1904, for copies of all correspondence exchanged between the department of finance and the town of Westmount, concerning the purchase of debentures of the Montreal Turnpike Trust. Presented 17th June, 1904.—*Mr. Rivet.*

*Not printed.*

**116.** Return to an order of the House of Commons, dated 1st June, 1904, for a copy of all correspondence between the post office authorities and Henry Goodrick, of Mount Royal Vale, in reference to his resignation as a post office employee. Presented 17th June, 1904.—*Mr. Monk*.......... *Not printed.*

**117.** Report from the office of the geographer of the department of the interior, relating to surveys made on the Grand Trunk Pacific Railway line. Presented (Senate) 17th June, 1904, by Hon. R. W. Scott.......... *Not printed.*

**118.** Return to an address of the Senate dated 31st May, 1904, of all geological and other expert reports in the hands of the government showing the existence of petroleum at Athabaska Landing and adjoining districts; also, the names of the districts in which crude oil has been discovered, with quantities produced in 1902 and 1903 by districts, together with the total quantity for Canada. Presented (Senate) 17th June, 1904.—*Hon. Mr. Poirier*.......... *Not printed.*

**119.** Return to an order of the House of Commons, dated 6th June, 1904, for copies of the evidence taken at an investigation held into the conduct of the postmaster at Matane, P.Q., in June, 1903; of the report of the investigating officer, and all correspondence, documents and papers, in relation to the said investigation. Presented 20th June, 1904.—*Mr. Casgrain*.......... *Not printed.*

**120.** Return to an order of the House of Commons, dated 30th May, 1904, of the correspondence between Dr. Rutherford, chief veterinary inspector, and Dr. Gerrow, and between the latter and John Campbell, Esq., of Fair view Farm, Mariposa, Woodville P.O., in relation to the shipment of sheep to the United States, and the quarantine therein; as well as in relation to the claim made by Mr. Campbell for repayment of express charges connected therewith. Presented 22nd June, 1904. *Mr. Hughes (Victoria)*.......... *Not printed.*

**121.** Return to an order of the House of Commons, dated 30th May, 1904, for copies of all correspondence between the government and any of its officials and the secretary of the provincial board of health of Manitoba, relating to matters of quarantine, or to restrict the spread of infectious diseases, since January the 1st, 1902. Presented 22nd June, 1904.—*Mr. Roche (Marquette.)*.......... *Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**122.** Return to on order of the House of Commons, dated 13th June, 1904, for copies of all deeds, papers, documents, correspondence, etc., now existing in any department, and filed since the 15th of September, 1903, in relation to the contract executed in the course of last session, for the establishment of a line of steamers between Canada and France, and to the subsidy payable for the said purpose, or to any matter or subject connected with the said contract and the said subsidy; and also a copy of contract between the government and Mr. Colombier. Presented 28th June, 1904.—*Mr. Casgrain.* *Not printed.*

**123.** Return of an order of the House of Commons, dated 30th May, 1904, for copies of all petitions, memorials, letters and other correspondence, between certain fishermen and any other party or parties, relating to any of the subject-matters contained in an official letter of the honourable minister of marine and fisheries, dated the 22nd of April, 1904, with regard to the authorization of the new lobster-canning licenses on the eastern coast of Prince Edward Island. Presented 28th June, 1904. *Mr. Lafurgey*........ .. ...... .......... . ...... ........... ...... *Not printed.*

**124** (1.) Return to an order of the House of Commons, dated 13th June, 1904, for copies of all correspondence with and by the government, or any department thereof, or with the officials of any department of the government, relating to applications for employment on the surveys of the proposed railway company of Canada, or the Grand Trunk Pacific Railway Company, in relation to such applications, since the 30th May ult., up to date. Presented 28th June, 1904.—*Mr. Clarke.* *Not printed.*

**124** (2.) Return to an order of the House of Commons, dated 15th June, 1904, for copies of additional correspondence since the last order of the house, in the matter of the employment of engineers in railway surveying or construction on the line of the proposed National Transcontinental Railway Presented 28th June, 1904.—*Mr. Borden (Halifax.)*...... ............................*Not printed.*

**125.** Protocol of the conference at Washington in May, 1898, preliminary to the appointment of a joint commission for the adjustment of questions at issue between the United States and Great Britain in respect to the relations of the former with the Dominion of Canada. Presented 29th June, 1904, by *Sir Wilfrid Laurier*.. ......... ...... ..... . .........................*Printed for sessional papers.*

**126.** Copy of a report of the committee of the honourable the privy council, approved by His Excellency the Governor General on the 22nd of June, 1904, rescinding the order in council of the 21st April, 1902, granting certain powers and priveleges to Malcolm H. Orr-Ewing, A. N. C. Treadgold and Walter Barwick. Presented 30th June, 1904, by Hon. C. Sifton.......... ...........*Not printed.*

**127.** Cases in the Privy Council on Appeal from the Supreme Court of Canada *re* representation in the House of Commons of certain Provinces of the Dominion: Between the Attorney General for the Province of New Brunswick, Appellant, and Attorney General for the Dominion of Canada, Respondent; and between the Attorney General for the Province of Prince Edward Island, Appellant, and Attorney General for the Dominion of Canada, Respondent. Presented 4th July, 1904, by Hon. C. Fitzpatrick........ ...., .... .......................*Printed for sessional papers.*

**128.** Partial return to an order of the House of Commons dated 20th June, 1904, for copies of (*a*) all reports, correspondence, statements, accounts and papers, relating to seizures of binder twine since the 1st of January, 1902, and to prosecutions in respect of the charges; (*b*) the correspondence and papers between the several departments relating to all and every such seizure and to the prosecution; of the charges; (c) all instructions given to any person or persons in relation to such seizures or or prosecutions; (*d*) the names, occupations and places of residence of all persons employed by or acting on behalf of the government, in relation to each of such seizures, or to the prosecution of the charges; (*e*) a statement of all expenses, charges or fees paid to or claimed by any person or persons, in connection with such seizures or prosecutions; and the papers connected with such payments and claims. Presented 6th July, 1904—*Mr. Clancy*.................. ................. . *Not printed.*

**128*a*.** Supplementary return to No. 128. Presented 15th July, 1904........... ............*Not printed.*

**129.** Extracts from two reports of a committee of the honourable the privy council respecting a lease, etc., to Mr. Michael P. Davis, of Ottawa, of a certain lot of land at the Lower Sheiks Island Dam on the the Cornwall Canal. Presented 11th July, 1904, by Sir Wilfrid Laurier... ...........*Not printed.*

**130.** Return to an order of the House of Commons, dated 12th July, 1904, for copies of correspondence and other papers respecting the extension of the command of Lieutenant-Colonel R. W. Gregory, commanding officer of the 2nd Dragoons, his subsequent resignation, &c. Presented 12th July, 1904, Sir Frederick Borden........................ ................... ... ... ... .... *Not printed.*

## CONTENTS OF VOLUME 13—*Continued.*

**130*a*.** Supplementary return to No. 130. Presented 2nd August, 1904 .......... *Not printed.*

**131.** Orders in council passed since last session, submitted for the approval of parliament, in accordance with the provisions of section 5 of chapter 34 of the Statutes of Canada, 1902, intituled : "An Act further to amend the Yukon Territory Act." Presented 12th July, 1904, by Hon. C. Sifton. *Not printed.*

**132.** Return to an address of the Senate, dated 14th June, 1904, for a copy of all reports made since the opening of navigation to the department of the interior on the subject of the French steamer *Le Malou*, and more particularly a copy of the report of Doctor Potvin concerning this vessel. Presented (Senate) 12th July, 1904 *Hon. Mr. Landry*.......... *Not printed.*

**133.** Return to an order of the House of Commons, dated 20th June, 1904, for copies of all correspondence between any department of the government of Manitoba and any department of the government of of the Dominion, relating to the acquisition, selection or survey of 256,000 acres of land, earned by the former Winnipeg and Hudson's Bay Railway Company, now the Canadian Northern Railway Company, and to which the government of the province of Manitoba is entitled. Presented 13th July, 1904.—*Mr. Stewart*.......... *Not printed.*

**134.** Return to an order of the House of Commons, dated 30th May, 1904, for copies of all correspondence, accounts and statements showing the cost of the buildings at Mabou, and at other points, which are used in connection with the creamery at Mabou, C.B.; the cost of the machinery, and the rental paid by the government ; the salaries paid by the government ; the price paid for milk and cream by the government ; the quantity of butter manufactured in each year ; the cost per pound of butter in each year ; the price at which such butter has been sold each year ; the government charge for manufacturing and marketing. Presented 13th July, 1904.—*Mr. Bell*.......... *Not printed.*

**135.** Return to an order of the House of Commons, dated 30th May, 1904, showing the number of pounds of butter and cheese which have been manufactured at the Dominion Dairy Station at Nappan, N.S., in each of the last three years. Also for a statement showing the cost of such cheese and butter in each year ; giving the items which enter into such total cost, and also showing the cost of manufacture and the cost of marketing per pound, by years. Presented 13th July, 1904.—*Mr. Bell*.. *Not printed.*

**136.** Return of an order of the House of Commons, dated 30th May, 1904, giving the number of chicken-fattening stations in operation in Prince Edward Island in the years, 1900, 1901, 1902, 1903, respectively, giving the locations of each, and the names of manager of each, for the respective years : the expenditure in each of these stations for the years named, and the refunds made from the sale of poultry, &c., stating separately the refund from each for the different years. Presented 13th July, 1904.—*Mr. Lefurgey*.......... *Not printed.*

**137.** Return to an order of the House of Commons, dated 25th April, 1904, for copies of all letters and other correspondence, between the board of trade of Alberton, Prince County, Prince Edward Island, and any other party or parties, and the government, relative to the importing of a fishing population, the construction of patent driers, and the general eucouragement of the deep-sea fisheries on the north shore of Prince Edward Island. Presented 14th July, 1904.—*Mr. Hackett*..... *Not printed.*

**138.** Return to an order of the House of Commons, dated 19th July, 1904, of copies of papers respecting the Canadian School of Musketry, Rockliffe, Ontario. Presented 19th July, 1904.—*Sir Frederick Borden*.......... *Not printed*

**139.** Return to an order of the House of Commons, dated 13th June, 1904, for a copy of all correspondence between the government and any person, or persons, in reference to the granting of pensions to those of the Canadian South African contingents who were wounded or sufferd any disability in such service. Presented 22nd July, 1904.—*Mr. Broder*.......... *Not printed.*

**140.** Return to an order of the House of Commons, dated 20th June, 1904, for copies of all contracts for public works entered into by the government, which required the contractors to pay their workmen fair wages, in accordance with the fair-wage resolution agreed upon by parliament in the session of 1900 ; also the amounts of money covered by these contracts. Presented 27th July, 1904.—*Mr. Smith (Vancouver)*.......... *Not printed.*

**140*a*.** Supplementary return to No. 140. Presented 3rd August, 1904.......... *Not printed.*

**141.** Correspondence and papers respecting the Canada Eastern Railway Company. Presented 29th July, 1904, by Hon. H. R. Emmerson.......... *Not printed.*

## CONTENTS OF VOLUME 13—*Concluded.*

**142.** Return to an address of the House of Commons, dated 17th March, 1904, for copies of the commission appointing Mr. Justice Britton and other commissioners to inquire into the Treadgold and other concessions in the Yukon Territory; and of all the evidence, exhibits, papers and documents produced at the investigation held by the said commissioners, and of any report or reports made by the said commissioners. Presented 1st August, 1904.—*Mr. Casgrain.*
*Printed for both distribution and sessional papers.*

**143.** Return to an order of the House of Commons, dated 30th May, 1904, for copies of all correspondence, documents and reports, between the government and any party or parties, relative to the question of weighing dairy products at the port of Montreal, or elsewhere in the Dominion of Canada; as well as all documents, papers and letters connected with the commission appointed to investigate the same. Presented 4th August, 1904.—*Mr. Pope*.................................. *Not printed.*

**144.** Return to an address of the House of Commons, dated 9th May, 1904, for copies of all correspondence between the government of British Columbia, the canners' association, or any other person, and the minister of marine and fisheries, or any official of the government, relating to the granting of fish-trap licenses in British Columbia; also any order in council relating to the same. Presented 6th August, 1904.—*Mr. Earle.* .................................. *Not printed.*

**145.** Return to an address of the Senate, dated 14th July, 1904, for a statement indicating, year by year, from the year 1901, inclusive, up to this day, the detail of the expenses incurred in the construction of the wharf at St. Alphonse of Ha! Ha! Bay. Presented (Senate) 8th August, 1904.—*Hon. Mr. Landry* .................................. *Not printed.*

**146.** Return to an address of the Senate, dated 21st June, 1904, for: 1. A statement showing, in so many distinct columns, the names, surnames, ages, occupations of each of the sailors, from the commander down to the lowest cabin boy, who went to Germany, or who in Germany took service, on board of the *Gauss*, and who have come back to this country. 2. The number of years, months or days previously devoted to sea service by each of the sailors of the *Gauss*. 3. The names of all the signers of an alleged complaint supposed to have been addressed to the minister of marine. 4. A copy of such complaint and of every answer thereto, as well as of all correspondence relating thereto. 5. A copy of all correspondence relating to the purchase of the *Gauss*, and of the instructions given to Captain Bernier. 6. A copy of the log kept on board since the vessel has been placed under the command of Captain Bernier. Presented (Senate) 8th August, 1904.—*Hon. Mr. Landry..Not printed.*

**147.** Return to an address of the Senate, dated 27th June, 1904, for copies of all correspondence relating to the purchase or building of ice-breakers for use on the St. Lawrence or other Canadian waters. Presented (Senate) 8th August, 1904.—*Hon. Sir Mackenzie Bowell.* .................. *Not printed.*

# REPORT, RETURNS AND STATISTICS

OF THE

# INLAND REVENUES

OF THE

# DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED JUNE 30

1903

## PART I. EXCISE, &c.

*PRINTED BY ORDER OF PARLIAMENT*

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY
1903

*To His Excellency the Right Honourable The Earl of Minto, Governor-General of Canada, &c., &c.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to transmit to Your Excellency the RETURNS AND STATISTICS of Inland Revenues of the Dominion of Canada, for the Fiscal Year ended June 30, 1903, as prepared and laid before me by the Deputy Minister of Inland Revenue.

All of which respectfully submitted.

M. E. BERNIER,
*Minister of Inland Revenue.*

# CONTENTS

| | Pages. |
|---|---|
| Report of the Deputy Minister of Inland Revenue, for the Fiscal Year ended June 30, 1903... | i to xxiii |
| Financial Statements, as detailed below... | 1 to 64 |
| Statistics, Hydraulic Rents, &c. (Appendix A), as detailed below... | 65 to 115 |
| Expenditures, &c. (Appendix B), as detailed below... | 116 to 160 |
| Index, Alphabetical... | *Vide end.* |

# FINANCIAL

| No. of Statements. | — | Pages. |
|---|---|---|
| 1 | General Revenue Account—Showing amount of Revenue accrued and collected from all sources during the year ended June 30, 1903... | 3 |
| 2 | General Expenditure Account—Showing the cost of collecting the above... | 4-5 |
| 3 | Excise Collection Divisions—In account with Revenue... | 6 to 9 |
| 4 | " " Expenditnre... | 10 to 13 |
| 5 | Hydraulic Rents, &c.—Summary Statement of Lessees account... | 14 |
| 6 | Bridges, Ferries, &c.—Lessees, &c., of—In account with Revenue... | 15-16 |
| 7 | Preventive Service—Expenditure Account... | 17 |
| 8 | Food Inspection " " ... | 18 |
| 9 | Bill Stamps—Distributors of—In account with Inland Revenue Department... | 19 |
| 10 | Law Stamps— " " " " ... | 20 |
| 11 | Sundry Minor Revenues... | 21 |
| 12 | " Expenditures... | 21 |
| 13 | Comparative Statement of Excisable Articles taken for consumption, during the years ended June 30, 1901, 1902 and 1903, respectively... | 22-23 |
| 14 | Statement showing the amounts deposited monthly (by Inland Revenue Officers and others) to the credit of the Honourable the Receiver General on account of each of the above Revenues, respectively... | 24 to 27 |
| 15 | Comparative Monthly Statement of Excise Revenue accrued—Showing increase or decrease of Revenue yielded by each article, respectively, during each month of the Fiscal Year, as compared with the respective periods of the previous year... | 28-29 |
| 16 | Refunds—Statement of—Showing names of parties to whom, and under what authority, duties were refunded... | 30 to 47 |
| 17 | Departmental Expenditure—Showing Expenditure on account of the Inside Service of the Department... | 48 |
| 18 | Weights and Measures, Gas, Electric Light and Law Stamps—Statement showing Revenue accrued... | 49 |
| 19 *(a)* | Weights and Measures—Inspection Districts—In account with Revenue... | 50-51 |
| 19 *(b)* | " Old " " " ... | 52 |
| 20 *(a)* | " Inspection Districts—In account with Expenditure... | 53-54 |
| 20 *(b)* | " Old " " " ... | 55 |
| 21 | Gas Inspection Districts—In account with Revenue... | 56-57 |
| 22 | " " " Expenditure... | 58-59 |
| 23 | Electric Light Inspection Districts—In account with Revenue... | 60 |
| 24 | " " " Expenditure... | 61 |
| 25 | Statement showing the transactions in connection with the manufacture of Methylated Spirits... | 62-63 |
| 26 | Statement showing the amount voted, and the Expenditure authorized, for each Service for 1902-1903... | 64 |

## STATISTICS (APPENDIX A.)

### EXCISE.

| —— | Spirits. | Malt. | Malt Liquor. | Manufactured Tobacco. | Raw Leaf Tobacco. | Canada Twist Tobacco. | Cigars. | Petroleum. | Bonded Manufactures. | Acetic Acid. | Methylated Spirits. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pge | Pge | Pge | Pge | Pge | Pge | Pge | Pge | Pge | Pge | Pge |
| RETURN OF MANUFACTURES—Showing the number of Licenses issued and Fees collected, the materials used, the quantity produced, the amount of duties collected, ex-manufactory, and the amount of duties accruing upon excisable articles warehoused....... | 66 | 74 | 80 | 82 | .... | ... | 90 | ... | 98 | 106 | .... |
| COMPARATIVE STATEMENT of the above, for the years ended June 30, 1902 and 1903, respectively........ | 67 | 75 | 81 | 83 | .... | ... | 92 | .... | 100 | 106 | .... |
| RETURN OF DISTILLERIES—Showing their transactions during the year ended June 30, 1903.......... .... | 68 | .... | .... | ... | .. | .... | .... | .... | .... | .... | .... |
| RETURN OF WAREHOUSE TRANSACTIONS—Showing the quantity of excisable goods remaining in bonded warehouses of each Collection Division, respectively, from previous years; quantity placed in warehouse ex-factory during the fiscal year ended June 30, 1903, placed in warehouse from other Collection Divisions; also, quantity ex-warehoused for consumption, with duty accrued thereon; ex-warehoused to be rewarehoused in other Collection Divisions; ex-warehoused for exportation; also quantity used in bonded factories, and remaining in warehouse June 30, 1903...... .. .... ...... | 70 | 76 | .... | 84 | 86 | .... | 94 | .... | 102 | 107 | .... |
| COMPARATIVE STATEMENT of the above, for the years ended June 30, 1902 and 1903, respectively........ | 72 | 78 | .... | 85 | 88 | ... | 95 | .... | 104 | 108 | .... |
| RETURN OF REVENUE collected from Canada Twist Tobacco ..... .......................... | .... | .... | .... | ... | .... | 89 | .... | .... | .... | .. . | .... |
| COMPARATIVE STATEMENT of the above, for the years ended June 30, 1902 and 1903, respectively.. ...... | .... | .... | .... | .... | .... | 89 | ... | .... | .... | .... | .... |
| RETURN OF FEES for Inspection of Petroleum, for the year ended June 30, 1903..... .. ............. | .. | .... | .... | .. | .... | . | ... | 96 | .... | .... | .... |
| COMPARATIVE STATEMENT of Petroleum Inspection Fees, for the years ended June 30, 1902 and 1903, respectively.... ..... ........... ........ | .... | .... | .... | .... | .... | .... | .... | 97 | .... | .... | ... |
| METHYLATED SPIRITS—Statement showing the quantity of raw material on hand at beginning of year, raw material used, quantity produced and how disposed of............ ..................... .... | .... | .... | .... | .... | .... | ... | ... | .... | .... | .... | 109 |

### HYDRAULIC AND OTHER RENTS.

| | | |
|---|---|---|
| 36<br>36 (*a*) | Amount due from each Lessee or Purchaser, July 1, 1902 ... .. .... .....<br>" accrued during the year ended June 30, 1903.... .... ........... .<br>" paid by each Lessee or Purchaser, during the year ended June 30, 1903...................... .................. . ..........<br>" remaining due by each Lessee or Purchaser on June 30, 1903..... ... | 110 to 115 |

## EXPENDITURES—(APPENDIX B.)

| — | Inside Service | Excise. | Minor Expenditures. | Weights and Measures. | Gas. | Electric Light. | Adulteration of Food. |
|---|---|---|---|---|---|---|---|
| | Page. | Page. | Page. | Page. | Page. | Page. | Page. |
| SALARIES. | 138 | 116 | 135 | 141 | 145 | 149 | 135 |
| Paid to each Officer employed in collecting Revenue.. | | | | | | | |
| SUPERANNUATION. | | | | | | | |
| How much deducted from each Officer's salary. ....... | | | | | | | |
| INSURANCE FEES. | | | | | | | |
| How much deducted from each Officer's salary.. .... | | | | | | | |
| RETIREMENT. | | | | | | | |
| How much deducted from each Officer's salary... ..... | | | | | | | |
| CONTINGENCIES. | | | | | | | |
| Authorized by the Department for office rent, fuel, travelling expenses, &c.... .... ................... | | | | | | | |

Distribution of Seizures.. .............. 133
List of persons employed during the year ended June 30, 1903. 151
" " a portion of the year ended June 30 1903 .. 159

# REPORT

OF THE

# DEPUTY MINISTER OF INLAND REVENUE

---

To the Honourable M. E. BERNIER,
Minister of Inland Revenue.

SIR,—Herewith I have the honour to submit statements of the Inland Revenues collected by this department during the fiscal year ended June 30, 1903, with the usual information as to the cost of collection and statistics respecting the sources whence these revenues were derived.

The following summary comparison shows the accrued revenue for the years ended June 30, 1899, 1900, 1901, 1902 and 1903, respectively :—

| — | 1899. | 1900. | 1901. | 1902. | 1903. |
|---|---|---|---|---|---|
| | $ | $ | $ | $ | $ |
| * Excise | 9,722,967 | 9,931.950 | 10,423,865 | 11,257,485 | 12,190,123 |
| Public Works | 5,090 | 5,366 | 4,805 | 4,749 | 4,901 |
| Culling Timber | 10,624 | 8,155 | 8,271 | ........ | ........ |
| Weights and Measures, Gas and Law Stamps | 73,499 | 78,510 | 81,987 | 88,198 | 109,535 |
| Electric Light | 11,520 | 14,452 | 15,568 | 21,062 | 23,895 |
| Other Revenues | 642 | 643 | 537 | 592 | 610 |
| Methylated Spirits | ........ | ........ | 73,675 | 66,785 | 72,269 |
| Totals | 9,824,342 | 10.039.076 | 10,608,708 | 11,438,871 | 12,401,333 |

* 1899 and 1900 include Methylated Spirits.

The increase over last fiscal year being $962,462.

DETAILS of Excise Revenue accrued during the undermentioned years.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | 1899. | 1900. | 1901. | 1902. | 1903. |
| | $ | $ | $ | $ | $ |
| Spirits | 4,609,619 | 4,821,218 | 5,180,775 | 5,620,613 | 6,162,827 |
| Malt Liquor | 6,807 | 7,174 | 6,569 | 6,970 | 9.485 |
| Malt | 849,468 | 910,537 | 977,330 | 1,077,809 | 1,020,623 |
| Tobacco | 3,320,168 | 3,281,640 | 3,337,848 | 3,563,578 | 3,904,617 |
| Cigars | 781,319 | 825,643 | 837,434 | 897,360 | 998,495 |
| * Petroleum and Acetic Acid | 46,060 | 5,505 | 8,910 | 8,862 | 6,128 |
| Manufactures in bond | 49,572 | 30,192 | 44,242 | 45,306 | 45,024 |
| Seizures | 10,713 | 6,071 | 1,292 | 1,567 | 2.830 |
| Other receipts | 24,192 | 34,132 | 29,465 | 35,419 | 40,094 |
| † Methylated Spirits | 25,049 | 9,838 | 73,675 | 66,785 | 72,269 |
| Totals | 9,722,967 | 9,931,950 | 10,497,540 | 11,324,269 | 12,262,392 |

* Petroleum for 1899 and 1900. Acetic Acid for 1901, 1902 and 1903.

† Years 1899 and 1900 show only the net revenue over expenditure, and 1901, 1902 and 1903 represents the gross revenue.

The quantity of spirits produced during the year was 4,063,603 proof gallons, as compared with 3,234,147 proof gallons produced in the previous fiscal year. The raw material used in its production being as follows :—

| | Lbs. |
|---|---|
| Malt | 4,435,316 |
| Indian corn | 49,515,912 |
| Rye | 12,035,017 |
| Wheat | 2,036,962 |
| Oats | 475,602 |
| Molasses | 1,514,687 |

The transaction of the several distilleries will be found stated in detail in Appendix A (Statement No. 3), pages 64 and 65.

| | | Proof Galls. |
|---|---|---|
| There were on July 1, 1902, in process of manufacture | | 141,783 |
| Manufactured during the year | | 4,063,603 |
| Returned to distilleries for re-distillation—Duty paid. | 538 | |
| " " " In bond | 870,231 | |
| | | 870,769 |
| Received into distilleries from other sources—Duty paid | | 6,163 |
| " " " In bond | | 177 |
| Total | | 5,082,495 |

This was disposed of as follows :—

| | Proof Gallons. |
|---|---|
| Placed in warehouse under crown lock . . . . . . . . . . | 4,953,575 |
| Fusel-oil written off . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 10,295 |
| Deficiency arising from rectification . . . . . . . . . . . . . . . | 1,019 |
| Remaining in process of manufacture, June 30, 1903, by actual stock taking . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 117,603 |
| Written off . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 3 |
| Total . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 5,082,495 |

The following statement shows the warehousing transactions in spirits during the year ended June 30, 1903, and the four preceding years :—

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Fiscal Years. | In Warehouse at beginning of year. | Warehoused during the year. Ex-distillery. | Otherwise Warehoused. | Taken for consumption. | Exported. | Used in Bonded Factories. | Otherwise accounted for. | For Re-Distillation. | In Warehouse at end of year. |
| | Pf. Galls. | Pf. Galls. | Pf. Galls. | Pf. Galls. | Pf. Galls. | Pf. Galls. | Pf. Galls. | Pf. Galls. | Pf. Galls. |
| 1898-9 . . . . . . | 11,260,036 | 3,914,094 | 145,805 | 2,404,599 | 120,161 | 360,876 | 138,300 | 475,007 | 11,820,992 |
| 1899-1900 . . | 11,820,992 | 3,113.001 | 135,196 | 2.523,576 | 138,637 | 345.312 | 131,222 | 470,315 | 11,460,127 |
| 1900-1901 . . . | 11,460.127 | 3.067,919 | 155,295 | 2,707,919 | 148,154 | 352,705 | 212,516 | 408,477 | 10,853,570 |
| 1901-1902 . . . . | 10,853.570 | 3.668,286 | 187,827 | 2,933,183 | 151,799 | 360,235 | 231,641 | 469,417 | 10,563.408 |
| Totals . . . . . . | 45,394,725 | 13,763,300 | 624,123 | 10,569,277 | 558,751 | 1.419,128 | 713,679 | 1,823,216 | 44.698,097 |
| Annual average of four years ended June 30, 1902. . . . . | 11,348,681 | 3.440.825 | 156.031 | 2,642,319 | 139,688 | 354,782 | 178,420 | 455,804 | 11,174.524 |
| 1902-3 . . . . . | 10,563.408 | 4,953.575 | 228,601 | 3,207,748 | 157,666 | 418,631 | 306,220 | 870.231 | 10,785,088 |

The quantities exported being as follows :—

| | Proof Gallons. |
|---|---|
| 1898–9 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 120,161 |
| 1899–1900 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 138,637 |
| 1900–1901 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 148,154 |
| 1901–1902 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 151,799 |
| 1902–1903 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 157,666 |

The following statement exhibits the entire quantities upon which duties were collected during the several years recited therein. The total column will be found to accord with the figures shown in Financial Statement No. 13, page 23:—

| Fiscal Years. | CANADIAN SPIRITS. | | Imported Spirits used in Bonded Factories. Paid difference between Customs and Excise Duty. | Total quantities upon which duty was collected. | Memorandum of Revenue accrued including License Fees. |
|---|---|---|---|---|---|
| | Paid duty Ex-distillery. | Paid duty Ex-warehouse. | | | |
| | Pf. Gallons. | Pf. Gallons. | Pf. Gallons. | Pf. Gallons. | $ |
| 1898-9 ....... .......... .. | 5,571 | 2,404,599 | 137,825 | 2,547,995 | 4,609,619 |
| 1899-1900 . ...... .... .. | 493 | 2,523,576 | 134,969 | 2,659,038 | 4,821,218 |
| 1900-1901..... ............. | 914 | 2,707,919 | 155,117 | 2,863,950 | 5,180,775 |
| 1901-1902 ......... ........ | 2,488 | 2,933,183 | 187,759 | 3,123,430 | 5,620,613 |
| Totals.. ... ... ....... | 9,466 | 10,569,277 | 615,670 | 11,194,413 | 20,232,225 |
| Annual average of four years ended June 30, 1902..... | 2,367 | 2,642,319 | 153,917 | 2,798,603 | 5,058,056 |
| 1902-1903............ ...... | 1,019 | 2,979,268 | 228,480 | 3,208,767 | 6,162,827 |

MALT :

The following statement shows the transactions in malt during the year 1902-1903, and the four preceding years :—

| Fiscal Years. | 1<br>In Warehouse at beginning of year. | 2<br>Manufactured during the year. | 3<br>Increase by absorption. | 4<br>Taken for consumption. | 5<br>Exported. | 6<br>Otherwise accounted for. | 7<br>In Warehouse at end of year. | 8<br>Memorandum of Revenue accrued, including License Fees. |
|---|---|---|---|---|---|---|---|---|
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| 1898-99.. .. . | 16,576,546 | 61,020,839<br>*2,387,782 | 552,363 | 56,212,822 | 301,774 | 2,240,747 | 21,782,187 | 849,468 |
| 1899-1900.... . | 21,782,187 | 61,497,029<br>*2,786,630 | 730,799 | 60,284,064 | 327,950 | 1,663,296 | 24,521,335 | 910,538 |
| 1900-1901...... | 24,521,335 | 64,095,899<br>*3,565,270 | 807,838 | 64,723,616 | 310,000 | 1,882,070 | 26,074,656 | 977,330 |
| 1901-02.. .... | 26,074,656 | 72,870,605<br>*3,600,214 | 835,511 | 71,440,519 | 369,230 | 1,314,308 | 30,256,929 | 1,077,809 |
| Totals.... | 88,954,724 | 259,484,372<br>*12,339,896 | 2,926,511 | 252,661,021 | 1,308,954 | 7,100,421 | 102,635,107 | 3,815,145 |
| Annual average of four years ended June 30, 1902 | 22,238,681 | 64,871,093<br>*3,084,974 | 731,628 | 63,165,255 | 327,239 | 1,775,105 | 25,658,777 | 953,786 |
| 1902-1903...... | 30,256,929 | 66,492,160<br>*3,596,116 | 739,592 | 67,608,157 | 287,040 | 1,735,390 | 31,454,210 | 1,020,623 |

* Imported.

TOBACCO :

The following Statement shows the transactions during the Fiscal Years ended June 30, 1899, 1900, 1901, 1902 and 1903 respectively, in Tobacco, Snuff and Cigarettes.

| Fiscal Years. | 1<br>In Warehouse, July 1. | 2<br>Manufactured during the year. | 3<br>Taken for consumption. | 4<br>Exported. | 5<br>Otherwise accounted for. | 6<br>In Warehouse, June 30. | 7<br>Raw Leaf taken for consumption. | 8<br>Canadian Twist taken for consumption. | 9<br>Total Tobacco taken for consumption. | 10<br>Duty collected thereon, including License fees. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| 1898-99 | 1,593,242 | 10,358,434 | 10,166,084 | 136,431 | 25,967 | 1,623,194 | 10,239,863 | 84,115 | 20,490,062 | 3,320,168 |
| 1899-1900 | 1,623,194 | 11,146,218 | 11,106,124 | 170,185 | 60,105 | 1,432,998 | 9,352,535 | 58,914 | 20,517,573 | 3,281,639 |
| 1900-1901 | 1,432,998 | 11,943,805 | 11,636,900 | 392,614 | 49,285 | 1,298,004 | 9,848,804 | 57,597 | 21,543,301 | 3,337,848 |
| 1901-1902 | 1,298,004 | 12,054,467 | 11,900,054 | 222,355 | 53,193 | 1,176,869 | 10,704,962 | 72,286 | 22,677,302 | 3,563,578 |
| Totals | 5,947,438 | 45,502,924 | 44,809,162 | 921,585 | 188,550 | 5,531,065 | 40,146,164 | 272,912 | 85,228,238 | 13,503,233 |
| Average for four years ended June 30, 1902 | 1,486,860 | 11,375,731 | 11,202,291 | 230,396 | 47,138 | 1,382,766 | 10,036,541 | 68,228 | 21,307,059 | 3,375,808 |
| 1902-1903 | 1,176,869 | 13,371,321 | 12,983,995 | 141,209 | 79,923 | 1,343,063 | 11,615,963 | 53,256 | 24,653,214 | 3,904,617 |

CIGARS:

The following statement shows the transactions in Cigars during the fiscal year ended June 30, 1903, and the four preceding years:—

| Fiscal Years. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| | In Warehouse July 1. | Manufactured during the Year. | Assessment to bring production up to Standard. | Taken for Consumption. | Exported. | Otherwise accounted for. | In Warehouse June 30. | Memorandum of Revenue accrued including License Fees. |
| | No. | No. | No. | No. | No. | No. | No. | $ |
| 1898-99 | 11,640,355 | 133,134,122 | 9,106 | 128,919,098 | 88,250 | .... | 15,776,235 | 781,319 |
| 1899-1900 | 15,776,235 | 139,389,477 | 8,430 | 138,041,707 | 189,975 | 17,300 | 16,925,160 | 825.643 |
| 1900-1901 | 16,925,160 | 141,430,454 | 7,660 | 141,096,889 | 158,450 | 59,500 | 17,048,435 | 837,434 |
| 1901-1902 | 17,048,435 | 156,686,795 | 4,096 | 151,780,516 | 128,845 | 7,150 | 21,822,815 | 897,360 |
| Totals | 61,390,185 | 570,640,848 | 29,292 | 559,838,210 | 565,520 | 83,950 | 71,572,645 | 3,341,756 |
| Annual average of four years ended June 30, 1902 | 15,347,546 | 142,660,212 | 7,323 | 139,959,552 | 141,380 | 20,988 | 17,893,161 | 835,439 |
| 1902-1903 | 21,822,815 | 171,996,232 | 84,875 | 168,290,422 | 190,920 | 662,450 | 24,760,130 | 998,495 |

The revenue derived from goods manufactured in bond during the past five years has been as follows:—

| | |
|---|---|
| 1898–99 | $ 33,494 |
| 1899–1900 | 30,192 |
| 1900–1901 | 44,242 |
| 1901–1902 | 45,306 |
| 1902–1903 | 45,024 |

ACETIC ACID:

The revenue derived from acetic acid during the last five years has been as follows:—

| | |
|---|---|
| 1898–99 | $ 16,078 |
| 1899–1900 | 9,647 |
| 1900–1901 | 8,910 |
| 1901–1902 | 8,862 |
| 1902–1903 | 6,128 |

INSPECTION OF PETROLEUM:

The quantity of Canadian Petroleum and Naphtha inspected during the year was as follows:—

| | Gallons. |
|---|---|
| Petroleum | 7,784,180 |
| Naphtha | 831,712 |
| Total | 8,615,892 |

PUBLIC WORKS:

The revenue accrued from this source was as follows:—

| | 1901–1902. | 1902–1903. |
|---|---|---|
| Hydraulic and other rents | $ 3,679 00 | $ 3,654 00 |
| Minor public works | 1,070 00 | 1,247 50 |

WEIGHTS AND MEASURES, GAS AND ELECTRIC LIGHT:

The usual special reports in relation to these services have been prepared, containing full statistical information.

The aggregate revenue accrued from these services was $113,294.60.

The cost of the three services being $121,575.02.

PREVENTION OF ALDULTERATION OF FOOD AND AGRICULTURAL FERTILIZERS:

The usual supplementary report in relation to this service will be submitted containing details of the work done and the report of the analysts.

METHYLATED SPIRITS:

The quantity of methylated spirits manufactured during the year, was 92,242 proof gallons; 94,187 gallons were sold. A statement of details appears on pages 62 and 105.

Appendix **B** contains, as usual, the details concerning illicit stills seized during the year.

Appendix **C** shows the amount of Excise Revenue collected at each out-office and under various headings, separately.

I have the honour to be, sir,

Your obedient servant,

W. J. GERALD,
*Deputy Minister.*

OTTAWA, August 18, 1903.

# APPENDIX A

TABLE showing the Annual Consumption per head of the undermentioned articles paying Excise and Customs Duties, and the Revenue per head derived annually.

| YEARS. | DOMINION OF CANADA. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity. | | | | | Duty. | | | | |
| | Spirits. | Beer. | Wine. | Tobacco. | Petroleum. | Spirits. | Beer. | Wine. | Tobacco. | Petroleum. |
| | Galls. | Galls. | Galls. | Lbs. | Galls. | $ | $ | $ | $ | $ |
| 1869 | 1·124 | 2·290 | ·115 | 1·755 | ·575 | ·761 | ·092 | ·037 | ·193 | ·041 |
| 1870 | 1·434 | 2·163 | ·195 | 2·190 | 1·103 | ·962 | ·085 | ·049 | ·259 | ·061 |
| 1871 | 1·578 | 2·490 | ·259 | 2·052 | 1·591 | 1·059 | ·095 | ·056 | ·336 | ·077 |
| 1872 | 1·723 | 2·774 | ·257 | 2·481 | 1·302 | 1·160 | ·108 | ·070 | ·422 | ·076 |
| 1873 | 1·682 | 3·188 | ·238 | 1·999 | 1·387 | 1·135 | ·120 | ·066 | ·350 | ·084 |
| 1874 | 1·994 | 3·012 | ·288 | 2:566 | 1·618 | 1·363 | ·119 | ·086 | ·442 | ·103 |
| 1875 | 1·394 | 3·091 | ·149 | 1·995 | 1·589 | 1·127 | ·114 | ·069 | ·428 | ·098 |
| 1876 | 1·204 | 2·454 | ·177 | 2·316 | 1·360 | 1·182 | ·098 | ·075 | 513 | ·105 |
| 1877 | ·975 | 2·322 | ·096 | 2·051 | 1·103 | ·949 | ·109 | ·057 | ·446 | ·084 |
| 1878 | ·960 | 2·169 | ·096 | 1·976 | ...... | ·927 | ·147 | ·052 | ·439 | ...... |
| 1879 | 1·131 | 2·209 | ·104 | 1·954 | ...... | 1·005 | ·125 | ·057 | ·449 | ...... |
| 1880 | ·715 | 2·248 | ·077 | 1·936 | ...... | ·772 | ·081 | ·055 | ·428 | ...... |
| 1881 | ·922 | 2·293 | ·099 | 2·035 | ...... | ·990 | ·081 | ·073 | ·443 | ...... |
| 1882 | 1·009 | 2·747 | ·120 | 2·150 | ...... | 1·084 | ·098 | ·092 | ·485 | ...... |
| 1883 | 1·090 | 2·882 | ·135 | 2·280 | ...... | 1·186 | ·103 | ·097 | ·473 | ...... |
| 1884 | ·998 | 2·924 | ·117 | 2·476 | ...... | 1·074 | ·104 | ·082 | 365 | ...... |
| 1885 | 1·126 | 2·639 | ·109 | 2·623 | ...... | 1·198 | ·111 | ·074 | ·393 | ...... |
| 1886 | ·711 | 2·839 | ·110 | 2·052 | ...... | 1·007 | ·091 | ·074 | ·502 | ...... |
| 1887 | ·746 | 3·084 | ·095 | 2·062 | ...... | 1·045 | ·100 | ·066 | 514 | ...... |
| 1888 | ·645 | 3·247 | ·094 | 2·093 | ...... | ·944 | ·110 | ·066 | ·509 | ...... |
| 1889 | ·776 | 3·263 | ·097 | 1·153 | ...... | 1·107 | ·114 | ·068 | ·529 | ...... |
| 1890 | ·883 | 3·360 | ·104 | 2·143 | ...... | 1·257 | ·121 | ·072 | ·539 | ...... |
| 1891 | ·745 | 3·790 | ·111 | 2·292 | ...... | 1·094 | ·137 | ·080 | ·590 | ...... |
| 1892 | ·701 | 3·516 | ·101 | 2·291 | ...... | 1·156 | ·211 | ·075 | ·680 | ...... |
| 1893 | 740 | 3·485 | ·094 | 2·314 | ...... | 1·235 | ·218 | ·070 | ·691 | ...... |
| 1894 | ·742 | 3·722 | ·089 | 2·264 | ...... | 1·235 | ·205 | ·060 | 683 | ...... |
| 1895 | ·666 | 3·471 | ·090 | 2·163 | ...... | 1·124 | ·161 | ·056 | ·645 | ...... |
| 1896 | ·623 | 3·528 | ·070 | 2·120 | ...... | 1·159 | ·164 | ·047 | ·639 | ...... |
| 1897 | ·723 | 3·469 | ·084 | 2 243 | ...... | 1·341 | ·213 | ·041 | ·671 | ...... |
| 1898 | ·536 | 3·808 | ·082 | 2·358 | ...... | 1·306 | ·126 | ·041 | ·615 | ...... |
| 1899 | ·661 | 3·995 | ·086 | 2·174 | ...... | 1·367 | ·174 | ·045 | ·841 | ...... |
| 1900 | ·701 | 4·364 | ·085 | 2·300 | ...... | 1·455 | ·185 | ·044 | ·853 | ...... |
| 1901 | ·765 | 4·737 | ·100 | 2·404 | ...... | 1·593 | ·198 | ·048 | ·875 | ...... |
| 1902 | .796 | 5·102 | ·090 | 2·404 | ...... | 1·653 | ·214 | ·048 | ·915 | ...... |
| 1903 | ·870 | 4·712 | ·096 | 2·548 | ...... | 1·812 | ·205 | ·051 | ·992 | ...... |
| Average | ·974 | 3·182 | ·123 | 2·178 | ...... | 1·135 | ·135 | ·034 | ·547 | ...... |

## APPENDIX B

### STATEMENT of Seizures of Illicit Manufactures for Fiscal Year ended June 30, 1903.

| Divisions. | Number. | Dates. | Names. | Residences. | Schedule Value. | Remarks. |
|---|---|---|---|---|---|---|
| | | | | | $ cts. | |
| Brantford | 46 | Aug. 21, 1902 | Albert Smith | Cornell P.O., Ont. | 10 00 | Fined $100, which he could not pay, and was consequenty put in jail. |
| Montreal | 1,077 | July 24, 1902 | P. Robidoux and C. Benoit | Montreal, P.Q. | 58 00 | Fined $100 each imposed and paid. |
| " | 1,078 | Aug. 28, 1902 | J. Leroux | " | 10 30 | " which was paid. |
| " | 1,079 | Jan. 3, 1903 | P. Dansereau | " | 27 20 | |
| " | 1,082 | May 1, 1903 | J. B. Barrette and M. Legault | " | 26 70 | Fine of $100 each imposed and paid. |
| " | 1,083 | June 23, 1903 | Jos. Rapin | " | 23 40 | " imposed and paid. |
| Quebec | 524 | July 18, 1902 | R. Poulin | St. Méthode, P.Q | 5 00 | |
| " | 525 | Jan. 21, 1903 | F. Dupuis | Quebec | 125 00 | |
| " | 526 | Mar. 4, 1903 | C. Thibault | St. Syabee, P.Q | 8 30 | |
| " | 527 | " 12, 1903 | Eug. Nadeau | St. Romuald, P.Q | 20 00 | |
| " | 528 | May 15, 1903 | A. Petitclerc | Notre-Dame des Anges | 2 50 | |
| " | 529 | " 15, 1903 | A. Groleau | " " | 1 50 | |
| St. Hyacinthe | 77 | July 17, 1902 | E. Boisvert | Notre-Dame de Pierreville. | 5 00 | |
| St. John, N.B. | 105 | Jan. 30, 1903 | O. Folsom | Carleton, N.B | 25 00 | Voluntary payment of $100 issued. |
| Picton | 103 | July 14, 1902 | D. McDonald and D. Gillies | Doctors Brook | 20 00 | Sentenced to pay $100 fine or six months in jail. |
| " | 104 | Dec. 23, 1902 | John Chisholm | Pinkietown | 12 00 | Fine of $100 imposed and paid. |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 16, 1903.

## APPENDIX C.

STATEMENT showing the amount of Excise and other Revenues collected at each of the undermentioned Out-Offices during the Fiscal Year ended June 30, 1903.

| Divisions. | Out-Offices | Licenses. | Spirits. | Malt Liquor. | Malt. | Tobacco. | Cigars. | Manufactures in Bond. | Other Receipts. | Electric Light Inspection Fees. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Belleville | Deseronto | | 1,925 06 | | | 1,827 50 | | | | | 3,752 56 |
| | Picton | | 2,032 41 | | | | | | | | 2,032 41 |
| | Trenton | | 7,053 37 | | | | | | | | 7,053 37 |
| Brantford | Embro | | | | | | | | | 5 00 | 5 00 |
| | Ingersoll | 150 00 | | | | 551 30 | 1,955 70 | | 92 93 | 10 00 | 2,759 93 |
| | Norwich | 50 00 | | | | | | 1,870 14 | 600 00 | 10 00 | 2,530 14 |
| | Paris | | | | | | | | | 10 00 | 10 00 |
| | Port Dover | 50 00 | | | | | | 414 17 | 357 86 | 5 00 | 827 03 |
| | Port Rowan | | | | | | | | | 5 00 | 5 00 |
| | Simcoe | | | | | | | | | 5 00 | 5 00 |
| | Tilsonburg | 100 00 | | | 2,030 25 | | | | | 10 00 | 2,140 25 |
| | Woodstock | 145 00 | 2,938 79 | | 2,114 69 | 661 00 | 1,821 00 | | 2,280 27 | 10 00 | 9,970 75 |
| Guelph | Berlin | 570 00 | 40,921 48 | | 10,133 70 | 9,062 13 | 17,295 87 | | | 25 00 | 78,008 18 |
| | Galt | 450 00 | | | 682 71 | 982 80 | 2,868 27 | | | 25 00 | 5,008 78 |
| | New Hamburg | 50 00 | | | 3,465 00 | | | | | 10 00 | 3,525 00 |
| | Preston | 250 00 | | | 3,528 62 | 811 80 | 2,613 90 | | | 20 00 | 7,224 32 |
| | Salem | 50 00 | | | | | | | | | 50 00 |
| | Waterloo | 575 00 | 496,903 12 | | 25,151 85 | 1,586 80 | 6,168 75 | | 5,871 20 | 25 00 | 536,281 72 |
| Hamilton | Dundas | 200 00 | | | 42,225 30 | | | | | | 42,425 30 |
| | Greensville | 150 00 | | | 8,882 67 | | | | | | 9,032 67 |
| Kingston | Napanee | 40 00 | 10,655 35 | | | 1,539 00 | | | | 35 00 | 12,269 35 |
| London | Alvinston | | | | | | | | | 5 00 | 5 00 |
| | Aylmer | | | | | | | | | 10 00 | 10 00 |
| | Dutton | | | | | | | | | 10 00 | 10 00 |
| | Forest | | | | | | | | | 10 00 | 10 00 |
| | Glencoe | | | | | | | | | 10 00 | 10 00 |
| | Lucan | | | | | | | | | 10 00 | 10 00 |
| | Parkhill | | | | | | | | | 10 00 | 10 00 |
| | Petrolea | 21 00 | 5,697 75 | | | | | | | 25 00 | 5,743 75 |
| | Sarnia | 186 00 | 26,884 52 | | 276 00 | 12,086 10 | 205 50 | | 59 75 | 10 00 | 39,707 87 |
| | St. Thomas | 220 00 | 2,635 39 | | 78 00 | 3,001 60 | 10,218 30 | | | 25 00 | 16,178 29 |
| | Strathroy | 120 00 | 2,553 98 | | 4,593 00 | | | | 231 10 | 10 00 | 7,508 08 |
| | Watford | | | | | | | | | 5 00 | 5 00 |
| | West Lorne | | | | | | | | | 5 00 | 5 00 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Owen Sound | Collingwood | 106 00 | 1,948 54 | | | 20,224 11 | | | | | 22,278 68 |
| | Kincardine | 10 00 | | | | | | | | | 10 00 |
| | Meaford | 40 00 | 1,318 05 | | | 3,702 50 | | | | | 5,060 55 |
| | Walkerton | 195 00 | | | 5,618 92 | 189 40 | 754 20 | | | | 6,757 52 |
| Perth | Arnprior | 40 00 | 8,939 21 | | | | | | | 25 00 | 9,004 21 |
| | Eganville | 20 00 | 1,869 22 | | | 2,563 00 | | | | 10 00 | 4,462 22 |
| | Carleton Place | 20 00 | 195 71 | | | | | | | | 215 71 |
| | North Bay | 20 00 | 9,573 59 | | | | | | | 10 00 | 9,603 59 |
| | Pembroke | 135 00 | 8,948 07 | | | 10,056 23 | 779 45 | | | 25 00 | 19,943 75 |
| | Renfrew | 40 00 | 7,057 48 | | | | | | | 20 00 | 7,117 48 |
| | Sturgeon Falls | 20 00 | 7,514 23 | | | | 60 00 | | | 10 00 | 7,604 23 |
| | Sudbury | 20 00 | 11,725 07 | | | | | | | 15 00 | 11,760 07 |
| Peterborough | Cobourg | 40 00 | 7,555 24 | | | | | | | 45 00 | 7,640 24 |
| | Lindsay | 50 00 | | | 656 40 | | | | | 60 00 | 766 40 |
| | Port Hope | 270 00 | 2,689 88 | | 7,149 35 | | | | | 10 00 | 10,119 23 |
| Port Arthur | Wabigoon | 20 00 | 3,420 56 | | | | | | | | 3,440 56 |
| Prescott | Brockville | 345 00 | 6,240 68 | | 4,957 50 | 1,017 42 | 3,859 80 | | | 25 00 | 16,445 40 |
| | Gananoque | 40 00 | 4,972 08 | | | | | | | 10 00 | 5,022 08 |
| St. Catharines | Beamsville | | | | | | | | | 5 00 | 5 00 |
| | Dunnville | 95 00 | 1,409 08 | | | 111 36 | 330 45 | | 50 00 | 10 00 | 2,005 89 |
| | Fort Erie | | | | | | | | 50 00 | | 50 00 |
| St. Catharines | Grimsby | | | | | | | | | 10 00 | 10 00 |
| | Humberstone | 75 00 | | | | 88 20 | 325 20 | | | | 488 40 |
| | Merritton | | | | | | | | | 10 00 | 10 00 |
| | Niagara | | | | | | | | 30 00 | 10 00 | 40 00 |
| | Niagara Falls | 100 00 | | | | 262 20 | 937 95 | | | 25 00 | 1,325 15 |
| | Port Colborne | 100 00 | | | 4,224 00 | | | | | | 4,324 00 |
| | Port Dalhousie | | | | | | | | | 10 00 | 10 00 |
| | Queenston | | | | | | | | 10 00 | | 10 00 |
| | Thorold | | | | | | | | | 25 00 | 25 00 |
| | Welland | 95 00 | 1,215 66 | | | 75 20 | 306 00 | | | 5 00 | 1,696 86 |
| Stratford | Goderich | 170 00 | 1,386 76 | | 1,875 00 | | | | 25 00 | | 3,456 76 |
| | Listowel | 125 00 | | | 3,194 25 | 841 10 | 3,330 00 | | 149 04 | | 7,639 39 |
| | Palmerston | 220 00 | | | 32,563 08 | | | | 5 00 | | 32,788 08 |
| | St. Mary's | 20 00 | 3,139 43 | | | 1,732 52 | | | | | 4,891 95 |
| Toronto | Barrie | 260 00 | | | 3,951 42 | | 292 80 | | | | 4,444 22 |
| | Hornby | 100 00 | | | 3,262 50 | | | | | | 3,362 50 |
| | Orillia | 100 00 | | | 783 00 | | | | | | 883 00 |
| | Sault Ste. Marie | 240 00 | 13,487 69 | | 5,407 50 | 6,097 90 | 1,473 30 | | | | 26,706 39 |
| Windsor | Chatham | 240 00 | 27,647 45 | | 594 00 | 980 90 | 3,596 97 | | | 25 00 | 33,084 32 |
| | Kingsville | 50 00 | | | | 2,779 55 | | | | 10 00 | 2,839 55 |
| | Leamington | 200 00 | | | | 10,312 45 | 2,844 45 | | | 10 00 | 13,366 90 |
| Joliette | Berthierville | 250 00 | 3,469 52 | | | | | | 4,521 56 | | 8,241 08 |
| | L'Epiphanie | 115 00 | | | | 224 38 | 4,802 55 | | | | 5,141 93 |
| Montreal | St. Jérôme | 115 00 | 34,952 20 | | | 3,019 70 | 7,595 25 | | | | 45,682 15 |
| | Ste. Therése | 50 00 | | | 417 60 | | | | | | 467 60 |
| | Valleyfield | 40 00 | 30,285 20 | | | | 156 00 | | | | 30,481 20 |
| Quebec | Gaspé | 40 00 | 4,221 41 | | | 475 00 | | | | | 1,736 41 |
| | Paspébiac | 20 00 | | | | 222 50 | | | | | 242 50 |
| | Fraserville | 60 00 | 8,156 99 | | | | | | | 25 00 | 8,241 99 |

STATEMENT showing the amount of Excise and other Revenues collected at each of the undermentioned Out-Offices during the Fiscal Year ended June 30, 1903—*Concluded.*

| Divisions. | Out-Offices. | Licenses. | Spirits. | Malt Liquor. | Malt. | Tobacco. | Cigars. | Manufactures in Bond. | Other Receipts. | Electric Light Inspection Fees. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Sherbrooke | Granby | 265 00 | | | | 210,407 66 | 18,984 42 | | | | 229,657 08 |
| St. Hyacinthe | Sorel | 100 00 | 37,122 00 | | | | | | | | 37,222 00 |
| | St. Johns, Que. | 135 00 | 37,140 03 | | | | | 4,297 17 | 601 55 | | 42,173 75 |
| | Victoriaville | 75 00 | 26,346 24 | | | | | | | | 26,421 24 |
| St. John | Campobello | 20 00 | 595 97 | | | | | | | | 615 97 |
| | Chatham | 20 00 | | | | 8,643 00 | | | | 10 00 | 8,673 00 |
| | Claire | 20 00 | 980 11 | | | | | | | | 1,000 11 |
| | Fredericton | 20 00 | | | | 16,089 75 | | | 4 00 | 10 00 | 16,123 75 |
| | Moncton | 40 00 | | | | 13,428 99 | | | 1 00 | 25 00 | 13,494 99 |
| | Newcastle | 20 00 | | | | 3,421 50 | | | | 5 00 | 3,446 50 |
| | Sackville | 20 00 | | | | 2,609 00 | | | | 10 00 | 2,639 00 |
| | Sussex | | | | | 2,571 25 | | | | 10 00 | 2,581 25 |
| | St. Stephens | 20 00 | | | | 3,378 75 | | | 8 00 | 10 00 | 3,416 75 |
| | Woodstock | 40 00 | 1,051 97 | | | 232 50 | | | 3 00 | 15 00 | 1,342 47 |
| Halifax | Amherst | 20 00 | 2,255 78 | | | 1,385 00 | | | | | 3,660 78 |
| | Truro | 20 00 | | | | 11,925 50 | | | | | 11,945 50 |
| | Yarmouth | 135 00 | | | | 6,936 70 | 559 80 | | | 10 00 | 7,641 50 |
| Pictou | Sydney | 30 00 | 929 59 | | | 52 25 | | | 1 00 | 25 00 | 1,037 84 |
| Winnipeg | Brandon | 285 00 | 40,959 76 | | 1,749 00 | 5,113 95 | 4,951 50 | | | 25 00 | 53,084 21 |
| | Carman | | | | | | | | | 5 00 | 5 00 |
| | Fort Francis | | 956 76 | | | | | | | | 956 76 |
| | Gretna | 20 00 | 3,747 34 | | | 350 00 | | | | | 4,117 34 |
| | Morden | 20 00 | 5,813 58 | | | | | | | 10 00 | 5,843 58 |
| | Neepawa | | | | | | | | | 10 00 | 10 00 |
| | Portage la Prairie | 40 00 | 27,296 58 | | | 2,286 61 | | | | 25 00 | 29,648 19 |
| | Prince Albert | 70 00 | 767 64 | | 1,125 00 | 264 88 | | | | 5 00 | 2,232 52 |
| | Rat Portage | 80 00 | 21,024 46 | | 108 48 | 2,480 00 | | | | 25 00 | 23,717 94 |
| | Regina | 10 00 | 1,158 45 | | | | | | | 10 00 | 1,178 45 |
| | Selkirk | 20 00 | 4,454 70 | | | | | | | 10 00 | 4,484 70 |
| | Virden | 20 00 | 6,031 31 | | | | | | | | 6,051 31 |
| Calgary | Edmonton | 330 00 | 17,450 07 | | 2,322 80 | 4,892 10 | 1,206 75 | | | 10 00 | 26,211 72 |
| | Lethbridge | 95 00 | 920 82 | | 1,416 41 | 1,479 75 | | | | 10 00 | 3,921 98 |
| | Pincher Creek | 20 00 | 852 51 | | | | | | | | 872 51 |
| | Wetaskiwin | 40 00 | 4,523 46 | | | | | | | | 4,563 46 |
| Vancouver | Atlin | 50 00 | | | 90 95 | | | | | | 140 95 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cranbrook | 110 00 | 7,664 51 | | | 893 23 | | | | | 8,667 74 |
| | Fernie | 145 00 | 9,137 50 | | 5,209 16 | 170 40 | 706 05 | | | | 15,368 11 |
| | Golden | 20 00 | 3,542 29 | | | 45 00 | | | | | 3,607 29 |
| | Grand Forks | 120 00 | 3,154 91 | | 603 15 | | | | | | 3,878 06 |
| | Greenwood | 120 00 | 8,504 35 | | 945 00 | | | | | | 9,569 35 |
| | Kamloops | 125 00 | | | 622 95 | 2,024 00 | 3,998 40 | | 265 00 | | 7,035 35 |
| | Kaslo | 90 00 | 838 59 | | | 415 50 | | | | | 1,344 09 |
| | Kelowna | 85 00 | | | | | 294 15 | | | | 379 15 |
| | Morrisey | 25 00 | | | 90 00 | | | | | | 115 00 |
| | Moyie City | 50 00 | | | | | | | | | 50 00 |
| | Nelson | 360 00 | 22,909 51 | | 2,494 74 | 851 55 | 2,430 00 | | | | 29,045 80 |
| | New Westminster | 220 00 | 5,864 73 | | 2,369 34 | 996 30 | 3,058 02 | | 1,552 90 | | 14,061 29 |
| | Phœnix | 50 00 | | | 488 48 | | | | | | 538 48 |
| | Revelstoke | 240 00 | 7,182 50 | | 547 26 | 854 45 | 576 00 | | | | 9,400 21 |
| | Rossland | 265 00 | 10,583 38 | | 4,638 25 | 181 72 | 600 30 | | | | 16,268 65 |
| | Sandon | 50 00 | | | 555 01 | | | | | | 605 01 |
| | Trail | 50 00 | | | 740 33 | | | | | | 790 33 |
| | Vernon | 32 50 | | | | 31 72 | 76 00 | | | | 140 22 |
| | Ymir | 50 00 | | | 154 50 | | | | | | 204 50 |
| Victoria | Ladysmith | 10 00 | | | | | | | | | 10 00 |
| | Nanaimo | 320 00 | 4,017 71 | | 8,410 90 | 771 78 | 2,052 00 | | 13 00 | | 15,585 39 |
| | Totals | 12,265 50 | 1,136,319 33 | | 212,498 02 | 402,270 47 | 114,085 05 | 6,581 48 | 16,783 16 | 1,075 00 | 1,901,878 01 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

# FINANCIAL RETURNS, 1902-1903

## No. 1.—GENERAL REVENUES ACCOUNT, 1902-1903.

Dr. Cr.

| Memo of Refunds deducted below. | Amounts deposited to the credit of the Receiver General. | Abatements. | Balances due June 30, 1903. | Totals. | Services. | Revenues of previous years not collected July 1, 1903. | Revenues accrued 1902-1903. | Totals. |
|---|---|---|---|---|---|---|---|---|
| $ cts | $ cts. | $ cts | $ cts | $ cts | | $ cts. | $ cts. | $ cts. |
| 246,590 12 | 12,190,946 66 | ........ | 14,628 11 | 12,205,575 10 | Excise and Seizures, per Statement No. 3 ...... | 15,452 28 | 12,190,122 82 | 12,205,575 10 |
| 100 00 | 3,584 00 | 20 00 | 27,850 17 | 31,454 17 | Hydraulic and other rents, per Statement No. 5.. | 27,800 17 | 3,654 00 | 31,454 17 |
| .. | 1,239 50 | ....... | 12,398 11 | 13,637 91 | Minor Public Works, per Statement No. 6 .... | 12,390 41 | 1,247 50 | 13,637 91 |
| .. | 64,327 65 | .......... | 92 72 | 64,420 37 | Weights and Measures, per Statements Nos. 19 (A) and 19 (B)............ | 180 32 | 64,240 05 | 64,420 37 |
| .......... | 25,159 80 | | .... | 25,159 80 | Gas Inspection, per Statement No. 21........ | ......... | 25,159 80 | 25,159 80 |
| 15 00 | 23,894 75 | | ........ | 23,894 75 | Electric Light Inspection, per Statement No 23 | ......... | 23,894 75 | 23,894 75 |
| ....... | 20,135 10 | ..... | ........ | 20,135 10 | Law Stamps, per Statements Nos. 10 and 18.... | .......... | 20,135 10 | 20,135 10 |
| .......... | .......... | .... | 45 04 | 45 04 | Bill Stamps, per Statement No. 9 ........ | 45 04 | ....... | 45 04 |
| .......... | 610 50 | ....... | .... | 610 50 | Sundry Minor Revenues, per Statement No. 11.. | .......... | 610 50 | 610 50 |
| 16 41 | 72,268 80 | ........ | ........ | 72,268 80 | Methylated Spirits, per Statement No. 25...... | .......... | 72,268 80 | 72,268 80 |
| 246,721 53 | 12,402,166 76 | .... | ..... | 12,457,201 54 | | ........... | 12,401,333 32 | 12,457,201 54 |
| .......... | 246,721 53 | .... | .. | 246,721 53 | ....Less Refunds as per Statement No. 16.... | ........... | 246,721 53 | 246,721 53 |
| ... | 12,155,445 23 | 20 00 | 55,014 78 | 12,210,480 01 | Totals ........ | 55,868 22 | 12,154,611 79 | 12,210,480 01 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

Dr.

## No. 2.—GENERAL EXPENDITURES

| Balances due to Collectors, &c., July 1, 1902. | Expenditures Authorized by the Department. | | | Balances due by Collectors, &c., June 30, 1903. | Totals. | Services. |
|---|---|---|---|---|---|---|
| | Salaries. | Contingencies. | Seizures. | | | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | |
| 1,167 53 | 322,872 65 | 95,149 24 | 138 33 | 343 98 | 419,671 73 | Excise and Seizures, per Statement No. 4.... |
| .......... | .......... | .......... | 2,375 31 | ........ | 2,375 31 | Excise Seizures, distributed per Statement No. 4, Appendix B.... |
| ...... | 3,184 26 | 7,571 33 | .......... | ........ | 10,755 59 | Preventive Service, per Statement No. 7.......... |
| .......... | 8,445 47 | 11,395 66 | .......... | ........ | 19,841 13 | Adulteration of Food, per Statement No. 8, Appendix B...... |
| .......... | ...... | 1,507 81 | .......... | ........ | 1,507 81 | Sundry Minor Expenditures, per Statement No. 12.......... |
| .......... | 41,360 00 | 4,789 24 | .......... | 16 66 | 46,165 90 | Departmental Expenditures, per Statement No. 17.......... |
| .......... | 55,179 78 | 32,327 82 | ........ | 193 26 | 87,700 86 | Weights and Measures, per Statements Nos. 20 (A) and 20 (B).... |
| ........ | 18,549 68 | 7,017 00 | ....... | 212 88 | 25,779 56 | Gas Inspection, per Statement No. 22.......... |
| ....... | 3,522 45 | 4,978 29 | .......... | ........ | 8,500 74 | Electric Light Inspection, per Statement No. 24...... |
| ......... | 5,544 00 | 43,644 38 | .......... | ........ | 49,188 38 | Methylated Spirits, per Statement No. 25.......... |
| 1,167 53 | 458,658 29 | 208,380 77 | 2,513 64 | 766 78 | 671,487 01 | ..............Totals.......... |

Inland Revenue Department,
Ottawa, August 18, 1903.

ACCOUNT, 1902-3. Cr.

| Balances due by Collectors, &c., July 1, 1902. | Amounts disbursed by the Receiver General on requisitions of the Department. | Deductions from Salaries for | | | | Balances due to Collectors, &c., June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|---|
| | | Superannuation. | Insurance. | Retirement. | Guarantees. | | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 443 98 | 408,769 80 | 4,978 85 | 71 26 | 4,135 34 | 1,222 92 | 49 08 | 419,671 73 |
| ....... | 2,375 31 | ....... | ....... | ....... | ....... | ....... | 2,375 31 |
| ....... | 10,749 83 | ....... | ....... | ....... | 5 76 | ....... | 10,755 59 |
| ....... | 19,730 13 | 111 00 | ....... | ....... | ....... | ....... | 19,841 13 |
| ....... | 1,507 81 | ....... | ....... | ....... | ....... | ....... | 1,507 81 |
| 16 66 | 45,239 79 | 670 55 | 116 40 | 122 50 | ....... | ....... | 46,165 90 |
| 193 26 | 86,906 33 | 366 00 | 80 04 | ....... | 155 23 | ....... | 87,700 86 |
| 212 88 | 25,284 36 | 161 04 | ....... | 5 00 | 116 28 | ....... | 25,779 56 |
| ....... | 8,497 29 | ....... | ....... | ....... | 3 45 | ....... | 8,500 74 |
| ....... | 49,098 38 | ....... | ....... | 90 00 | ....... | ....... | 49,188 38 |
| 866 78 | 658,159 03 | 6,287 44 | 268 20 | 4,352 84 | 1,503 64 | 49 08 | 671,487 01 |

W. J. GERALD,
*Deputy Minister.*

## EXCISE,

### No. 3.—Collection Divisions

Dr. *(For Details, see*

| Balances due July 1, 1902 | Amount Accrued during the Year, including License Fees. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Spirits. | Malt Liquor. | Malt. | Tobacco. | Cigars. | Acetic Acid. | Bonded Manufactures. | Seizures. |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| ........ | 96,384 08 | 50 00 | 4,737 71 | 3,709 80 | 3,261 00 | ........ | ........ | ........ |
| 112 61 | 29,141 04 | 150 00 | 11,405 94 | 8,373 90 | 24,561 18 | ........ | 2,466 65 | ........ |
| ........ | 8,802 05 | ........ | ........ | 73 35 | ........ | ........ | ........ | ........ |
| ........ | 549,795 97 | 450 00 | 71,275 89 | 15,725 51 | 32,326 89 | ........ | ........ | ........ |
| ........ | 234,866 58 | 150 00 | 68,929 36 | 439,445 17 | 65,899 65 | ........ | 5,088 72 | 10 00 |
| ........ | 73,111 17 | 100 00 | 33,880 87 | 17,319 52 | 18,864 60 | ........ | 2,157 59 | ........ |
| ........ | 74,780 90 | 300 00 | 68,779 91 | 82,625 46 | 191,997 12 | ........ | ........ | ........ |
| ........ | 274,908 02 | 150 00 | 9,058 45 | 40,574 54 | 3,036 30 | ........ | ........ | ........ |
| ........ | 22,283 64 | 300 00 | 19,761 17 | 40,583 98 | 4,225 99 | ........ | ........ | ........ |
| ........ | 84,754 28 | ........ | 100 00 | 12,619 23 | 914 45 | ........ | ........ | ........ |
| ........ | 43,125 58 | 150 00 | 13,373 01 | 138 20 | 785 70 | ........ | ........ | ........ |
| ........ | 28,931 66 | 50 00 | 2,438 12 | 4,091 50 | ........ | ........ | ........ | ........ |
| ........ | 102,540 81 | 100 00 | 18,439 85 | 1,032 42 | 4,084 80 | ........ | 300 00 | ........ |
| ........ | 14,950 15 | 100 00 | 15,992 98 | 2,981 31 | 8,766 60 | ........ | ........ | 50 00 |
| ........ | 35,691 44 | 250 00 | 39,315 74 | 7,192 94 | 9,815 85 | ........ | ........ | ........ |
| 69 00 | 742,162 10 | 650 00 | 202,368 65 | 222,838 82 | 94,771 01 | 5,964 96 | 13,097 04 | 310 00 |
| ........ | 361,058 72 | 150 00 | 45,485 75 | 22,735 50 | 10,293 42 | ........ | 400 00 | ........ |
| 522 89 | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| 704 50 | 2,777,288 19 | 3,100 00 | 625,343 40 | 922,061 15 | 473,604 56 | 5,964 96 | 23,510 00 | 370 00 |
| | | | | | | | | |
| ........ | 52,736 43 | 50 00 | ........ | 4,095 93 | 7,703 55 | ........ | ........ | ........ |
| 2,359 56 | 1,497,633 92 | 500 00 | 146,047 11 | 1,999,546 53 | 323,429 56 | 163 53 | 10,626 65 | 873 20 |
| 315 75 | 490,914 24 | 200 00 | 55,276 27 | 115,229 72 | 37,098 57 | ........ | 2,043 66 | ........ |
| ........ | 158,594 06 | 50 00 | 20,457 00 | 218,353 95 | 42,105 24 | ........ | 300 00 | 50 00 |
| 174 79 | 150,266 84 | ........ | ........ | 3,357 89 | 11,073 59 | ........ | 4,966 11 | ........ |
| ........ | 56,486 52 | ........ | ........ | 1,269 34 | 4,131 11 | ........ | ........ | ........ |
| 3,295 57 | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| 6,145 67 | 2,406,632 01 | 800 00 | 221,780 38 | 2,341,853 36 | 425,541 62 | 163 53 | 17,936 42 | 923 20 |
| | | | | | | | | |
| ........ | 145,555 83 | 100 00 | 20,552 55 | 105,413 57 | 13,780 52 | ........ | 1,783 89 | 700 00 |
| 1,442 62 | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| 1,442 62 | 145,555 83 | 100 00 | 20,552 55 | 105,413 57 | 13,780 52 | ........ | 1,783 89 | 700 00 |
| | | | | | | | | |
| ........ | 58,664 97 | 200 00 | 40,733 28 | 93,603 67 | 4,790 46 | ........ | ........ | 250 00 |
| ........ | 929 59 | ........ | ........ | 25,575 18 | ........ | ........ | ........ | 108 07 |
| 5,860 50 | ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ |
| 5,860 50 | 59,594 56 | 200 00 | 40,733 28 | 119,178 85 | 4,790 46 | ........ | ........ | 358 07 |
| | | | | | | | | |
| ........ | 965 84 | 75 00 | 1,409 40 | 57,044 54 | ........ | ........ | ........ | ........ |

1902–1903.

in Account with Revenue.

*Appendix A.)*

Cr.

| Other Receipts. | Total Duties Accrued. | Total Debits. | Divisions. | Deposited to the credit of the Receiver General. | Balances due June 30, 1903. | Total Credits. |
|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. |
| 1,123 50 | 109,266 09 | 109,266 09 | ..Belleville | 109,266 09 | .......... | 109,266 09 |
| 965 00 | 77,063 71 | 77,176 32 | ..Brantford | 77,063 71 | 112 61 | 77,176 32 |
| 85 00 | 8,960 40 | 8,960 40 | ..Cornwall | 8,960 40 | .......... | 8,960 40 |
| 5,931 20 | 675,505 46 | 675,505 46 | ..Guelph. | 675,505 46 | .......... | 675,505 46 |
| 2,507 57 | 816,897 05 | 816,897 05 | ..Hamilton | 816,897 05 | .......... | 816,897 05 |
| 531 25 | 145,965 00 | 145,965 00 | ..Kingston | 145,965 00 | .......... | 145,965 00 |
| 222 00 | 418,705 39 | 418,705 39 | ..London | 418,705 39 | .......... | 418,705 39 |
| 409 54 | 328,136 85 | 328,136 85 | ..Ottawa. | 328,136 85 | .......... | 328,136 85 |
| 180 00 | 87,334 78 | 87,334 78 | ..Owen Sound | 87,334 78 | .......... | 87,334 78 |
| 543 00 | 98,930 96 | 98,930 96 | ..Perth | 98,930 96 | .......... | 98,930 96 |
| 80 00 | 57,652 49 | 57,652 49 | ..Peterborough | 57,652 49 | ....... | 57,652 49 |
| 120 00 | 35,631 28 | 35,631 28 | ..Port Arthur | 35,631 28 | .......... | 35,631 28 |
| 163 20 | 126,661 08 | 126,661 08 | ..Prescott. | 126,661 08 | .......... | 126,661 08 |
| 145 00 | 42,986 04 | 42,986 04 | .St. Catharines | 42,986 04 | .......... | 42,986 04 |
| 100 00 | 92,365 97 | 92,365 97 | ..Stratford. | 92,265 97 | .......... | 92,365 97 |
| 5,596 71 | 1,287,759 29 | 1,287,828 29 | ..Toronto | 1,287,796 79 | 31 50 | 1,287,828 29 |
| 8,210 11 | 448,333 50 | 448,333 50 | ..Windsor. | 448,333 50 | .......... | 448,333 50 |
| .......... | .......... | 522 89 | ..Suspense Account | .......... | 522 89 | 522 89 |
| 26,913 08 | 4,858,155 34 | 4,858,859 84 | ... *Ontario* | 4,858,192 84 | 667 00 | 4,858,859 84 |
| 4,561 56 | 69,147 47 | 69,147 47 | Joliette | 69,147 47 | ...... | 69,147 47 |
| 3,181 01 | 3,982,001 51 | 3,984,361 07 | ..Montreal | 3,982,576 79 | 1,784 28 | 3,984,361 07 |
| 784 15 | 701,546 61 | 701,862 36 | ..Quebec | 701,778 06 | 84 30 | 701,862 36 |
| 115 83 | 440,026 08 | 440,026 08 | ..Sherbrooke | 440,026 08 | .......... | 440,026 08 |
| 1,168 55 | 170,832 98 | 171,007 77 | ..St. Hyacinthe | 170,876 19 | 131 58 | 171,007 77 |
| 80 00 | 61,966 97 | 61,966 97 | ..Three Rivers | 61,966 97 | .......... | 61,966 97 |
| .......... | .......... | 3,295 57 | ..Suspense Account | .......... | 3,295 57 | 3,295 57 |
| 9,891 10 | 5,425,521 62 | 5,431,667 29 | .... *Quebec* | 5,426,371 56 | 5,295 73 | 5,431,667 29 |
| 899 50 | 288,785 86 | 288,785 86 | ..St. John | 288,710 86 | 75 00 | 288,785 86 |
| .......... | .......... | 1,442 62 | . Suspense Account | .......... | 1,442 62 | 1,442 62 |
| 899 50 | 288,785 86 | 290,228 48 | .. *New Brunswick* | 288,710 86 | 1,517 62 | 290,228 48 |
| 350 00 | 198,592 38 | 198,592 38 | ..Halifax | 198,592 38 | .......... | 198,592 38 |
| 110 00 | 26,722 84 | 26,722 84 | ..Pictou | 26,722 84 | ...... | 26,722 84 |
| .......... | .......... | 5,860 50 | ..Suspense Account | .......... | 5,860 50 | 5,860 50 |
| 460 00 | 225,315 22 | 231,175 72 | ... *Nova Scotia* | 225,315 22 | 5,860 50 | 231,175 72 |
| 20 00 | 59,514 78 | 59,514 78 | ..Charlottetown, *P.E.I.* | 59,514 78 | .......... | 59,514 78 |

## EXCISE

### No. 3.—Collection Divisions

Dr.

*(For Details, see*

| Balances due July 1, 1902. | Amount Accrued during the Year, including License Fees. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Spirits. | Malt Liquor. | Malt. | Tobacco. | Cigars. | Acetic Acid. | Bonded Manufactures. | Seizures. |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| .......... | 440,515 74 | 275 00 | 37,795 67 | 251,162 84 | 43,380 54 | .......... | 1,793 23 | ......... |
| .......... | 47,574 44 | 225 00 | 17,442 28 | 7,009 55 | 2,874 36 | ........ | .......... | ......... |
| .......... | 488,099 18 | 500 00 | 55,237 95 | 258,172 39 | 46,254 90 | ......... | 1,793 23 | ......... |
| 1,202 09 | 156,526 35 | 4,360 20 | 31,989 48 | 67,621 29 | 23,421 72 | .......... | ...... ... | 178 66 |
| 96 90 | 119,721 30 | 350 00 | 23,576 56 | 33,183 99 | 11,101 67 | .......... | .......... | 300 00 |
| 1,298 99 | 276,247 65 | 4,710 20 | 55,566 04 | 100,805 28 | 34,523 39 | ... ... .. | .......... | 478 66 |
| .......... | 8,452 63 | ........ | ........... | 87 50 | .......... | .......... | .. ... ... | ......... |
| 15,452 28 | 6,162,826 89 | 9,485 20 | 1,020,623 00 | 3,904,616 64 | 998,495 45 | 6,128 49 | 45,023 54 | 2,829 93 |
| .. ....... | 78,992 13 | 50 00 | 95,889 43 | 71,104 33 | 0 45 | .. ....... | 174 53 | ......... |
| .......... | 6,083,834 76 | 9,435 20 | 924,733 57 | 3,833,512 31 | 998,495 00 | 6,128 49 | 44,849 01 | 2,829 93 |

Inland Revenue Department,
Ottawa, August 18, 1903.

1902–1903.

in Account with Revenue—*Concluded.*

*Appendix A.)* Cr.

| Other Receipts. | Total Duties Accrued. | Total Debits. | Divisions. | Deposited to the credit of the Receiver General. | Balances due June 30, 1903. | Total Credits. |
|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. |
| 860 00 | 775,783 02 | 775,783 02 | ..Winnipeg.................... | 775,783 02 | .......... | 775,783 02 |
| 220 00 | 75,345 63 | 75,345 63 | ..Calgary.... .......... | 75,345 63 | .......... | 75,345 63 |
| 1,080 00 | 851,128 65 | 851,128 65 | ..... *Manitoba and N. W. T.* | 851,128 65 | .......... | 851,128 65 |
| 620 00 | 284,717 70 | 285,919 79 | ..Vancouver................ | 284,717 70 | 1,202 09 | 285,919 79 |
| 170 00 | 188,403 52 | 188,500 42 | ..Victoria.... ............ | 188,414 92 | 85 50 | 188,500 42 |
| 790 00 | 473,121 22 | 474,420 21 | ......*British Columbia*...... | 473,132 62 | 1,287 59 | 474,420 21 |
| 40 00 | 8,580 13 | 8,580 13 | ..Yukon.................... | 8,580 13 | .......... | 8.580 13 |
| 40,093 68 | 12.190,122 82 | 12,205,575 10 | ..........Totals...... .... | 12,190,946 66 | 14,628 44 | 12,205,575 10 |
| 379 25 | 246,590 12 | ........ .. | ..Less—Refunds as per Statement No. 16. | | | |
| 39,714 43 | 11,943,532 70 | ............ | ..Net Revenue. | | | |

W. J. GERALD,
*Deputy Minister.*

## EXCISE,

### No. 4.—Collection Divisions

Dr. *(For Details*

| Balances due by Collectors, July 1, 1902. | Amounts received from Department to meet Expenditures. | Deductions from Salaries for | | | | Balances due to Collectors, June 30, 1903. | Totals. | Divisions. |
|---|---|---|---|---|---|---|---|---|
| | | Superannuation. | Insurance. | Retirement. | Guarantee. | | | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | |
| 43 98 | 8,395 43 | 163 62 | .... | 34 26 | 28 08 | .... | 8,665 37 | Belleville |
| .... | 8,488 41 | 139 35 | .... | 102 37 | 27 96 | .... | 8,758 09 | Brantford |
| .... | 1,077 80 | 20 00 | .... | .... | 3 60 | .... | 1,101 40 | Cornwall |
| .... | 17,007 47 | 343 10 | .... | 34 26 | 52 56 | .... | 17,437 39 | Guelph |
| .... | 20,300 89 | 326 10 | .... | 244 47 | 73 44 | .... | 20,944 90 | Hamilton |
| .... | 8,403 35 | 144 64 | .... | .... | 25 20 | .... | 8,573 19 | Kingston |
| .... | 19,437 44 | 339 83 | 71 76 | 143 48 | 57 60 | .... | 20,050 11 | London |
| .... | 7,119 55 | 71 20 | .... | 184 68 | 27 12 | .... | 7,402 55 | Ottawa |
| .... | 5,497 40 | 84 08 | .... | 39 42 | 15 48 | .... | 5,636 38 | Owen Sound |
| .... | 7,361 92 | 49 96 | .... | 205 22 | 36 72 | .... | 7,653 82 | Perth |
| .... | 3,518 47 | 30 00 | .... | 95 68 | 12 96 | .... | 3,657 11 | Peterborough |
| .... | 1,270 74 | 19 96 | .... | 7 44 | 5 40 | .... | 1,303 54 | Port Arthur |
| .... | 8,635 29 | 126 92 | .... | 57 48 | 29 28 | .... | 8,848 97 | Prescott |
| .... | 4,643 70 | 102 08 | .... | 31 14 | 18 72 | .... | 4,795 64 | St. Catharines |
| .... | 6,486 50 | 110 88 | .... | 33 72 | 20 16 | .... | 6,651 26 | Stratford |
| .... | 36,783 84 | 583 40 | .... | 409 13 | 125 04 | .... | 37,901 41 | Toronto |
| .... | 21,218 60 | 327 15 | .... | 222 78 | 81 96 | 49 08 | 21,899 57 | Windsor |
| .... | 8,384 52 | 92 00 | .... | .... | 27 00 | .... | 8,503 52 | District Inspectors |
| 43 98 | 194,031 32 | 3,074 27 | 71 76 | 1,845 53 | 668 28 | 49 08 | 199,784 22 | *Ontario.* |
| .... | 5,782 12 | 28 04 | .... | 177 23 | 20 47 | .... | 6,007 86 | Joliette |
| .... | 42,526 79 | 519 62 | .... | 725 61 | 163 66 | .... | 43,935 68 | Montreal |
| .... | 17,396 37 | 215 72 | .... | 133 87 | 47 23 | .... | 17,793 19 | Quebec |
| .... | 6,788 40 | 55 96 | .... | 160 38 | 24 96 | .... | 7,029 70 | Sherbrooke |
| .... | 8,132 53 | 64 44 | .... | 206 14 | 33 75 | .... | 8,436 86 | St. Hyacinthe |
| .... | 2,671 53 | 42 00 | .... | .... | 7 20 | .... | 2,720 73 | Three Rivers |
| 100 00 | 3,094 37 | 11 49 | .... | 125 00 | 11 25 | .... | 3,242 11 | District Inspectors |
| 100 00 | 86,392 11 | 937 27 | .... | 1,528 23 | 308 52 | .... | 89,266 13 | *Quebec* |
| .... | 8,391 94 | 133 96 | .... | 60 00 | 35 04 | .... | 8,620 94 | St. John |
| .... | 2,667 75 | 50 00 | .... | .... | 9 00 | .... | 2,726 75 | District Inspector |
| .... | 11,059 69 | 183 96 | .... | 60 00 | 44 04 | .... | 11,347 69 | *New Brunswick* |
| .... | 11,152 08 | 219 44 | .... | .... | 38 16 | .... | 11,409 68 | Halifax |
| .... | 2,475 89 | 19 96 | .... | 65 34 | 9 36 | .... | 2,570 55 | Pictou |
| .... | 13,627 97 | 239 40 | .... | 65 34 | 47 52 | .... | 13,980 23 | *Nova Scotia* |
| 100 00 | 2,257 12 | 43 96 | .... | .... | 6 48 | .... | 2,407 56 | *Charlottetown, P.E.I.* |
| 200 00 | 15,858 42 | 200 83 | .... | 176 20 | 48 96 | .... | 16,484 41 | Winnipeg |
| .... | 4,559 56 | 45 00 | .... | 44 76 | 12 00 | .... | 4,661 32 | Calgary, N.W.T. |
| .... | 3,919 15 | 50 00 | .... | .... | 9 00 | .... | 3,978 15 | District Inspector |
| 200 00 | 24,337 13 | 295 83 | .... | 220 96 | 69 96 | .... | 25,123 88 | *Manitoba and N.W.T.* |

1902–1903.

in Account with Expenditures.

*see Appendix B.)*

CR.

| Balances due to Collectors, July 1, 1902. | Expenditures authorized by the Department. | | | | | | Balances due by Collectors, June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|---|---|
| | Salaries. | Seizures Expenditure | Special Assistance | Rent. | Travelling Expenses. | Sundries. | | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| | 8,242 66 | | | | 204 83 | 173 90 | 43 98 | 8,665 37 |
| | 8,308 30 | 9 60 | | | 267 55 | 172 64 | | 8,758 09 |
| | 1,000 00 | | | | | 101 40 | | 1,101 40 |
| | 16,478 72 | | | 136 92 | 365 50 | 456 25 | | 17,437 39 |
| | 20,468 67 | | | | 97 22 | 379 01 | | 20,944 90 |
| | 7,240 00 | | 500 00 | 270 00 | 127 00 | 436 19 | | 8,573 19 |
| 49 99 | 18,706 87 | | 619 92 | 80 00 | 172 54 | 420 79 | | 20.050 11 |
| | 7,261 96 | 1 50 | | | | 139 09 | | 7,402 55 |
| | 4,992 50 | | | 125 00 | 370 10 | 148 78 | | 5,636 38 |
| 41 65 | 7,005 58 | | | 120 00 | 182 89 | 303 70 | | 7.653 82 |
| 7 50 | 3,415 00 | 0 75 | | | 103 65 | 130 21 | | 3.657 11 |
| | 1,150 00 | | | | 101 70 | 51 84 | | 1.303 54 |
| | 8,349 92 | | | | 10 55 | 488 50 | | 8,848 97 |
| | 4,422 50 | | | 48 00 | 177 70 | 147 44 | | 4,795 64 |
| | 6,225 00 | | | | 217 30 | 208 96 | | 6,651 26 |
| | 35.792 43 | | 766 57 | 30 00 | 761 80 | 550 61 | | 37,901 41 |
| 178 29 | 20,830 04 | | 208 32 | 72 00 | 391 95 | 218 97 | | 21,899 57 |
| | 6,900 00 | | | 225 00 | 1,215 23 | 163 29 | | 8,503 52 |
| 277 43 | 186,790 15 | 11 85 | 2,094 81 | 1,106 92 | 4.767 51 | 4,691 57 | 43 98 | 199,784 22 |
| | 4.944 34 | | 538 72 | | 346 10 | 178 70 | | 6,007 86 |
| 342 74 | 38,748 57 | 41 85 | 2.745 69 | | 782 25 | 1,274 58 | | 43,935 68 |
| 438 72 | 12.664 60 | 41 07 | 3,349 56 | | 727 69 | 571 55 | | 17.793 19 |
| 44 90 | 6,010 76 | | | 143 00 | 586 77 | 244 27 | | 7,029 70 |
| | 6,827 75 | 5 10 | 908 76 | 144 00 | 130 92 | 420 33 | | 8,436 86 |
| 63 74 | 2,100 00 | | 500 04 | | | 56 95 | | 2.720 73 |
| | 3.074 98 | | | | 225 92 | 41 21 | | 3,242 11 |
| 890 10 | 74,371 00 | 88 02 | 8,042 77 | 287 00 | 2.799 65 | 2,787 59 | | 89,266 13 |
| | 8,020 00 | | | | 345 74 | 255 20 | | 8,620 94 |
| | 2,500 00 | | | | 218 05 | 8 70 | | 2,726 75 |
| | 10,520 00 | | | | 563 79 | 263 90 | | 11.347 69 |
| | 10.985 00 | | | | 167 40 | 257 28 | | 11.409 68 |
| | 2,307 77 | 38 46 | | | 126 98 | 97 34 | | 2,570 55 |
| | 13,292 77 | 38 46 | | | 294 38 | 354 62 | | 13,980 23 |
| | 2,200 00 | | | 33 13 | | 74 43 | 100 00 | 2,407 56 |
| | 13,328 57 | | 1,952 04 | 180 00 | 511 40 | 312 40 | 200 00 | 16,484 41 |
| | 2,695 92 | | 99 96 | 90 00 | 1.225 60 | 549 84 | | 4.661 32 |
| | 2.500 00 | | | | 1,364 88 | 113 27 | | 3,978 15 |
| | 18,524 49 | | 2.052 00 | 270 00 | 3,101 88 | 975 51 | 200 00 | 25.123 88 |

## EXCISE,

### No. 4.—Collection Divisions

(*For Details*

| Balances due by Collectors, July 1, 1902. | Amounts received from Department to meet Expenditures. | Deductions from Salaries for |  |  |  | Balances due to Collectors, June 30, 1903. | Totals. | Divisions. |
|---|---|---|---|---|---|---|---|---|
|  |  | Superannuation. | Insurance. | Retirement. | Guarantee. |  |  |  |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |  |
| .......... | 12,822 34 | 31 36 | ..... | 397 85 | 48 96 | .......... | 13,300 51 | ..Vancouver.............. |
| .......... | 5,523 83 | 122 80 | ..... | 17 43 | 20 16 | .......... | 5,684 22 | ..Victoria ... .......... |
| .......... | 2,969 09 | 50 00 | ..... | ........ | 9 00 | .......... | 3,028 09 | ..District Inspector....... |
| .......... | 21,315 26 | 204 16 | .... | 415 28 | 78 12 | .......... | 22,012 82 | ....*British Columbia*...... |
| .......... | 236 97 | ........ | ..... | ........ | ........ | .......... | 236 97 | ..Inspector of Distilleries . |
| .......... | 140 38 | ........ | ..... | ........ | ........ | .......... | 140 38 | .Inspector of Bonded Factories ......... . |
| .......... | 6,910 18 | ........ | ..... | ........ | ........ | .......... | 6,910 18 | ..General Expenditures... |
| .......... | 894 31 | ........ | ..... | ........ | ........ | .......... | 894 31 | ..Legal Expenses......... |
| .......... | 7,072 22 | ........ | ..... | ........ | ........ | .......... | 7,072 22 | ..Printing.......... .... |
| .......... | 1,552 45 | ........ | ..... | ........ | ........ | .......... | 1,552 45 | ..Stationery........ .. . |
| .......... | 515 00 | ........ | ..... | ........ | ........ | .......... | 515 00 | ..Lithographing, Engraving, &c ......... ..... |
| .......... | 5,478 94 | ........ | ..... | ........ | ........ | .......... | 5,478 94 | ..Commission to Customs Officers........ ..... |
| .......... | 50 84 | ........ | ..... | ........ | ........ | .......... | 50 84 | ..Commission on sale of Stamps for Canada Twist ........ .. .. |
| .......... | 26,000 00 | ........ | ..... | ........ | ........ | .......... | 26,000 00 | ..Tobacco Stamps......... |
| .......... | 6,897 91 | ........ | ..... | ........ | ........ | .......... | 6,897 91 | ..Duty-pay to officers in charge of most important establishments.... |
| 443 98 | 408,769 80 | 4,978 85 | 71 76 | 4,135 34 | 1,222 92 | 49 08 | 419,671 73 | .....*Grand Totals* .. . . |

Inland Revenue Department,
Ottawa, August 18, 1903.

1901–1902.

in Account with Expenditures—*Concluded.*

*see, Appendix B.)*

| Balances due to Collectors, July 1, 1902. | Expenditures authorized by the Department. | | | | | | Balances due by Collectors, June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|---|---|
| | Salaries. | Seizures Expenditure | Special Assistance | Rent. | Travelling Expenses. | Sundries. | | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| ......... | 9,529 32 | ......... | 1,649 90 | 965 00 | 406 82 | 749 47 | ......... | 13,300 51 |
| ......... | 4,994 95 | ......... | 480 00 | ......... | 40 10 | 169 17 | ......... | 5,684 22 |
| ......... | 2,500 00 | ......... | ......... | ......... | 528 09 | ......... | ......... | 3,028 09 |
| ......... | 17,024 27 | ......... | 2,129 90 | 965 00 | 975 01 | 918 64 | ......... | 22,012 82 |
| ......... | ......... | ......... | ......... | ......... | 236 45 | 0 52 | ......... | 236 97 |
| ......... | ......... | ......... | ......... | ......... | 139 38 | 1 00 | ......... | 140 38 |
| ......... | 149 97 | ......... | ......... | ......... | ......... | 6,760 21 | ......... | 6,910 18 |
| ......... | ......... | ......... | ......... | ......... | ......... | 894 31 | ......... | 894 31 |
| ......... | ......... | ......... | ......... | ......... | ......... | 7,072 22 | ......... | 7,072 22 |
| ......... | ......... | ......... | ......... | ......... | ......... | 1,552 45 | ......... | 1,552 45 |
| ......... | ......... | ......... | ......... | ......... | ......... | 515 00 | ......... | 515 00 |
| ......... | ......... | ......... | ......... | ......... | ......... | 5,478 94 | ......... | 5,478 94 |
| ......... | ......... | ......... | ......... | ......... | ......... | 50 84 | ......... | 50 84 |
| ......... | ......... | ......... | ......... | ......... | ......... | 26,000 00 | ......... | 26,000 00 |
| ......... | ......... | ......... | ......... | ......... | ......... | 6,897 91 | ......... | 6,897 91 |
| 1,167 53 | 322,872 65 | 138 33 | 14,319 48 | 2,662 05 | 12,878 05 | 65,289 66 | 343 98 | 419,671 73 |

W. J. GERALD,
*Deputy Minister.*

# HYDRAULIC AND OTHER RENTS.

## No. 5.—Summary Statement of Lessees' Accounts, 1902-1903.

*(For Details, see Appendix 'A.')*

| Balances due July 1, 1902. | Accrued during the Year ended June 30, 1903. | Totals. | — | Abatement. | Deposited to the credit of the Receiver General. | Balances due June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts |
| 1,883 84 | 3,361 00 | 5,244 84 | Chaudière Falls and Ottawa River | | 3,349 00 | 1,895 84 | 5,244 84 |
| 100 00 | 26 00 | 126 00 | St. Lawrence River | | 1 00 | 125 00 | 126 00 |
| 20 00 | | 20 00 | St. Maurice River | 20 00 | | | 20 00 |
| 70 00 | | 70 00 | Rivière du Lièvre | | | 70 00 | 70 00 |
| 678 00 | 267 00 | 945 00 | Sundry properties | | 234 00 | 711 00 | 945 00 |
| | | | *Land Sales.* | | | | |
| 15,573 50 | | 15,573 50 | Principal Accounts | | | 15,573 50 | 15,573 50 |
| 9,474 83 | | 9,474 83 | Interest | | | 9,474 83 | 9,474 83 |
| 27,800 17 | 3,654 00 | 31,454 17 | | 20 00 | 3,584 00 | 27,850 17 | 31,454 17 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## No. 6.—MINOR PUBLIC WORKS, 1902-3.

Dr. Cr.

| Balances due July 1, 1902. | Accrued during the Year ended June 30, 1903. | Totals. | Works. | Deposited to the credit of the Receiver General. | Balances due June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | *Bridges.* | $ cts. | $ cts. | $ cts. |
| 2,600 62 | | 2,600 62 | Dunnville | | 2,600 62 | 2,600 62 |
| | | | *Ferries.* | | | |
| | 10 00 | 10 00 | Bristol | 10 00 | | 10 00 |
| | 15 00 | 15 00 | Buckingham and Cumberland | 15 00 | | 15 00 |
| | 50 00 | 50 00 | Buffalo and Point Abinot | 50 00 | | 50 00 |
| | 10 00 | 10 00 | Clair Station and Kent | | 10 00 | 10 00 |
| | 10 00 | 10 00 | Cross Point and Campbellton | 10 00 | | 10 00 |
| 20 00 | | 20 00 | Edmunston and Maine | | 20 00 | 20 00 |
| | 50 00 | 50 00 | Fort Erie and Buffalo | 50 00 | | 50 00 |
| | 15 00 | 15 00 | Hawkesbury and Grenville | 15 00 | | 15 00 |
| 1,736 79 | | 1,736 79 | Hull (old lease) | | 1,736 79 | 1,736 79 |
| | 200 50 | 200 50 | La Passe and Gower Point | 200 50 | | 200 50 |
| | 6 00 | 6 00 | Montebello and Alfred | 6 00 | | 6 00 |
| | 30 00 | 30 00 | Niagara and Youngstown | 30 00 | | 30 00 |
| 2 00 | 2 00 | 1 00 | Ottawa and Kettle Island | 4 00 | | 4 00 |
| | 1 00 | 4 00 | Ouellette Street, Detroit | 1 00 | | 1 00 |
| | 5 00 | 5 00 | Papineauville and Brown's wharf | 5 00 | | 5 00 |
| | 100 00 | 100 00 | Pembroke and Allumette Island (new lease) | 100 00 | | 100 00 |
| 1 00 | | 1 00 | Pembroke and Allumette Island (old lease) | | 1 00 | 1 00 |
| | 200 00 | 200 00 | Prescott and Ogdensburg | 200 00 | | 200 00 |
| | 10 00 | 10 00 | Queenston and Lewiston (new lease) | 10 00 | | 10 00 |
| | 125 00 | 125 00 | Quyon | 125 00 | | 125 00 |
| | 5 00 | 5 00 | Rockliffe and Gatineau | 5 00 | | 5 00 |
| | 1 00 | 1 00 | Sandwich and Detroit | 1 00 | | 1 00 |
| | 100 00 | 100 00 | Sault Ste-Marie | 100 00 | | 100 00 |
| 30 00 | | 30 00 | St. Leonard and Van Buren | | 30 00 | 30 00 |
| | | | *Sundries.* | | | |
| 8,000 00 | | 8,000 00 | Dundas and Waterloo Road | | 8,000 00 | 8,000 00 |
| | 2 00 | 2 00 | Government Telegraph Lines | 2 00 | | 2 00 |

## No. 6.—MINOR PUBLIC WORKS, 1902-3—*Concluded.*

Dr. Cr.

| Balances due July 1, 1902. | Accrued during the Year ended June 30, 1903. | Totals. | Works. | Deposited to the credit of the Receiver General. | Balances due June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. |
| | | | *Sundries*—Concluded. | | | |
| ........... | 25 00 | 25 00 | Wiarton Docks | 25 00 | ........... | 25 00 |
| ........... | 175 00 | 175 00 | Part of building, Portland, N.B. | 175 00 | ........... | 175 00 |
| ........... | 100 00 | 100 00 | Building Ouellette Avenue, Windsor, Ont. | 100 00 | ........... | 100 00 |
| 12,390 41 | 1,247 50 | 13,637 91 | Totals | 1,239 50 | 12,398 41 | 13,637 91 |

W. J. GERALD,  
*Deputy Minister.*

Inland Revenue Department,  
Ottawa, August 18, 1903.

## PREVENTIVE SERVICE, 1902 1903.

Dr.

### No. 7. In Account with Expenditures.

Cr.

| Amounts received from Department to meet Expenditures. | Guarantee. | Totals. | | Expenditures Authorized by Department. | | | | Totals. |
|---|---|---|---|---|---|---|---|---|
| | | | | Salaries. | Special Assistance. | Travelling Expenses. | Sundries. | |
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 562 50 | | 562 50 | Ottawa, Ont | 562 50 | | | | 562 50 |
| 3 50 | | 3 50 | Owen Sound, Ont | | | 2 20 | 1 30 | 3 50 |
| 24 45 | | 21 45 | Peterborough, Ont. | | | 15 15 | 9 00 | 24 45 |
| 2,183 96 | 5 76 | 2,189 72 | Toronto, Ont. | 1,199 88 | 892 90 | 88 75 | 8 19 | 2,189 72 |
| 283 00 | | 283 00 | Joliette, Que | | 283 00 | | | 283 00 |
| 658 71 | | 658 71 | Montreal, Que | | 600 00 | 47 98 | 10 73 | 658 71 |
| 3,052 71 | | 3,052 71 | Quebec, Que | | 3,000 00 | 52 71 | | 3,052 71 |
| 499 92 | | 499 92 | St. Hyacinthe, Que | | 499 92 | | | 499 92 |
| 137 55 | | 137 55 | Sherbrooke, Que | | | 137 55 | | 137 55 |
| 1,688 15 | | 1,688 15 | St. John, N.B | 1,421 88 | 27 96 | 230 19 | 8 12 | 1,688 15 |
| 269 76 | | 269 76 | Halifax, N.S. | | 199 92 | 69 81 | | 269 76 |
| 1,083 05 | | 1,083 05 | Pictou, N.S | | 993 20 | 88 11 | 1 71 | 1,083 05 |
| 5 50 | | 5 50 | Vancouver, B.C. | | | 5 50 | | 5 50 |
| 297 07 | | 297 07 | General | | | | 297 07 | 297 07 |
| 10,749 83 | 5 76 | 10,755 59 | Totals | 3,184 26 | 6,496 90 | 738 28 | 336 15 | 10,755 59 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## FOOD INSPECTION, 1902 1903.

### No. 8.—In Account with Expenditures.

*(For Details, see Appendix B.)*

Dr. Cr.

| Amounts received from Department to meet Expenditures. | Super-annuation | Totals. | — | Expenditures authorized by the Department. | | | | | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Salaries. | Special Assistance. | Rent. | Travelling Expenses. | Sundries. | |
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 10,201 93 | 100 00 | 10,301 93 | Chief analyst | 6,213 33 | 1,797 74 | 400 00 | 58 90 | 1,831 96 | 10,301 93 |
| 16 66 | | 16 66 | Ottawa | 16 66 | | | | | 16 66 |
| 776 33 | | 776 33 | Seaforth | 500 00 | | 150 00 | 55 70 | 76 63 | 776 33 |
| 600 78 | 7 00 | 607 78 | Montreal | 350 00 | | | 146 85 | 110 93 | 607 78 |
| 321 77 | | 321 77 | St. Hyacinthe | 200 00 | | | 50 61 | 71 16 | 321 77 |
| 9 50 | | 9 50 | Sherbrooke | | | | | 9 50 | 9 50 |
| 279 71 | 4 00 | 283 71 | St. John, N.B. | 200 00 | | | 36 79 | 46 92 | 283 71 |
| 385 46 | | 385 46 | Halifax | 300 00 | | | 56 35 | 29 11 | 385 46 |
| 130 06 | | 130 06 | Prince Edward Island | 100 00 | | | 4 25 | 25 81 | 130 06 |
| 303 75 | | 303 75 | Calgary | 200 00 | | | 67 90 | 35 85 | 303 75 |
| 283 06 | | 283 06 | Winnipeg | 165 48 | | | 61 70 | 55 88 | 283 06 |
| 268 75 | | 268 75 | Vancouver | 200 00 | | | 28 15 | 40 60 | 268 75 |
| 5,402 96 | | 5,402 96 | General | | | | | 5,402 96 | 5,402 96 |
| 662 67 | | 662 67 | Printing | | | | | 662 67 | 662 67 |
| 86 74 | | 86 74 | Stationery | | | | | 86 74 | 86 74 |
| 19,730 13 | 111 00 | 19,841 13 | Totals | 8,445 47 | 1,797 74 | 550 00 | 567 20 | 8,480 72 | 19,841 13 |

Inland Revenue Department,
Ottawa, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## BILL STAMPS, 1902-1903.

Dr. — No. 9.—Bill Stamp Distributors in account with the Inland Revenue Department. — Cr.

| Balances July 1, 1902. | | Totals. | | Balances June 30, 1903. | | Totals. |
|---|---|---|---|---|---|---|
| Stamps on hand. | Cash on hand. | | | Stamps on hand. | Cash on hand. | |
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. |
| 1,372 77 | | 1,372 77 | Post Office Department | 1,372 77 | | 1,372 77 |
| | 11 54 | 11 54 | Belleville, ex-Collector E. R. Benjamin | | 11 54 | 11 54 |
| | 33 50 | 33 50 | Three Rivers, ex-Collector B. Lassalle | | 33 50 | 33 50 |
| 160 00 | | 160 00 | McLeod, Colonel J. F., Fort McLeod | 160 00 | | 160 00 |
| 1,532 77 | 45 04 | 1,577 81 | Totals | 1,532 77 | 45 04 | 1,577 81 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## LAW STAMPS.

DR. No. 10.—LAW STAMPS Distributors in account with the Inland Revenue Department. CR.

| Stamps on hand July 1, 1902 | Stamps received from Department. | Totals. | — | Commission of 5 per cent allowed by Department on stamps sold. | Deposited to the credit of the Receiver General. | Stamps on hand June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. |
| | 1,300 00 | 1,300 00 | Cameron, R., Registrar, Supreme Court | 65 00 | 1,235 00 | | 1,300 00 |
| | 3,418 00 | 3,418 00 | Audette, L. A., Registrar, Exchequer Court | 170 90 | 3,247 10 | | 3,418 00 |
| 18,250 00 | 8,000 00 | 26,250 00 | Lithgow, J. T., Dawson, Yukon Territorial Court | | 13,096 00 | 13,154 00 | 26,250 00 |
| | 5,200 00 | 5,200 00 | " " Mining Court | | 2,557 00 | 2,643 00 | 5,200 00 |
| 18,250 00 | 17,918 00 | 36,168 00 | Totals | 235 90 | 20,135 10 | 15,797 00 | 36,168 00 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## Dr. No. 11.—SUNDRY MINOR REVENUES, 1902-1903. Cr.

| Accrued during the Year ended June 30, 1903. | Totals. | —— | Deposited to the credit of the Receiver General. | Totals. |
|---|---|---|---|---|
| $ cts. | $ cts. | | $ cts. | $ cts. |
| 455 00 | 455 00 | ......Fertilizers Inspection Fees ........... | 455 00 | 455 00 |
| 117 00 | 117 00 | ......Adulteration of Food Fees................. | 117 00 | 117 00 |
| 38 50 | 38 50 | . Casual Revenue......... | 38 50 | 38 50 |
| 610 50 | 610 50 | ..................Totals.................. | 610 50 | 610 50 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## Dr. No. 12.—MINOR EXPENDITURES, 1902-1903. Cr.

| Amounts received from Department to meet Expenditures. | Totals. | —— | Contingencies. | Totals. |
|---|---|---|---|---|
| $ cts. | $ cts. | | $ cts. | $ cts. |
| 1,507 81 | 1,507 81 | ....Minor expenditures.............. | 1,507 81 | 1,507 81 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

No. 13.—STATEMENT showing the quantities of the several articles subject to Excise and the Duty

| Articles Subject to Excise Duty. | 1901. | | | |
|---|---|---|---|---|
| | Quantities. | | | Duty. |
| | Ex-Manufactory. | Ex-Warehouse. | Totals. | |
| | Gallons. | Gallons. | Gallons. | $ cts. |
| Spirits | 914<br>Imported. | 2,707,919<br>*155,117 | 2,708,833<br>155,117 | 5,131,739 99<br>46,535 13 |
| Totals | 914 | 2,863,036 | 2,863,950 | 5,178,275 12 |
| Malt liquor, the duty being paid on malt | 25,108,254 | | 25,108,254 | 68 90 |
| | Lbs. | Lbs. | Lbs. | |
| Malt | 1,104 | 64,722,512 | 64,723,616 | 970,855 15 |
| Cigars— | No. | No. | No. | |
| Foreign | 71,874,913 | 61,272,370 | 133,147,283 | 798,889 88 |
| Canadian | 1,942,666 | 166,300 | 2,108,966 | 6.326 89 |
| Combination | 3,472,940 | 2,367,700 | 5,840,640 | 17,521 92 |
| Totals | 77,290,519 | 63,806,370 | 141,096,889 | 822,738 69 |
| Cigarettes— | No. | No. | No. | |
| Foreign | 119,343,584 | 1,024,000 | 120,367,584 | 361,102 75 |
| Canadian | | 275,000 | 275,000 | 412 50 |
| Combination | 741,000 | | 741,000 | 1,111 50 |
| Totals | 120,084,584 | 1,299,000 | 121,383,584 | 362,626 75 |
| | Lbs. | Lbs. | Lbs. | |
| Tobacco from Foreign leaf | 592,597½ | 6,171,934½ | 6,764,532 | 1,691,133 43 |
| " Canadian leaf | 2,624,181½ | 482,480½ | 3,106,662 | 155,333 23 |
| " Combination leaf | 557,346½ | 644,413 | 1,201,759½ | 60,088 10 |
| Snuff | 199,795 | | 199,795 | 36,399 20 |
| Canadian twist | | 57,597 | 57,597 | 2,879 85 |
| Totals | 3,973,920½ | 7,356,425 | 11,330,345½ | 2,368,460 56 |
| Raw leaf tobacco, foreign | | 9,848,803¾ | 9,848,803¾ | 1,026,265 72 |
| Total duties on tobacco and cigarettes | | | | 3,334,726 28 |
| Vinegar | | | | 42,067 16 |
| Acetic acid | | | | 8,809 62 |
| Licenses, spirits | | | | 2,500 00 |
| " malt liquor | | | | 6,500 00 |
| " malt | | | | 6,475 00 |
| " cigars | | | | 14,695 00 |
| " tobacco | | | | 3,122 00 |
| " vinegar | | | | 2,175 00 |
| " acetic acid | | | | 100 00 |
| " petroleum | | | | 1 00 |
| | | | | 10,393,108 92 |

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* Spirits imported for use in the manufacture of crude fulminate, on which duty at the rate of 30 cents

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

Duty taken for consumption, during the years ended June 30, 1901, 1902 and 1903, accrued thereon.

| 1902. | | | | 1903. | | | |
|---|---|---|---|---|---|---|---|
| Quantities. | | | Duty. | Quantities. | | | Duty. |
| Ex-Manufactory. | Ex-Warehouse. | Totals. | | Ex-Manufactory. | Ex-Warehouse. | Totals. | |
| Gallons. | Gallons. | Gallons. | $ cts. | Gallons. | Gallons. | Gallons. | $ cts. |
| 2,488 | 2,933,183 | 2,935,671 | 5.561,785 41 | 1,019 | 2,979,268 | 2,980,287 | 6,091,782 97 |
| Imported. | *187,759 | 187,759 | 56,327 57 | Imported. | *228,480 | 228,480 | 68,543 92 |
| 2,488 | 3,120,942 | 3,123,430 | 5,618,112 98 | 1,019 | 3,207,748 | 3,208,767 | 6,160,326 89 |
| 27,623,767 | .... | 27,623,767 | 369 70 | 25,755,154 | .... | 25,755,154 | 2,910 20 |
| Lbs. | Lbs. | Lbs. | | Lbs. | Lbs. | Lbs. | |
| .... | 71,440,519 | 71,440,519 | 1,071,608 74 | .... | 67,608,157 | 67,608,157 | 1,014,123 06 |
| No. | No. | No. | | No. | No. | No. | |
| 79,815,531 | 62,268,640 | 142,084,171 | 852,508 68 | 83,121,844 | 76,003,930 | 159,125,774 | 954,766 50 |
| 2,961,230 | 750,920 | 3,712,150 | 11,136 45 | 2,185,260 | 696,100 | 2,881,360 | 8,644 08 |
| 2,927,345 | 3,056,850 | 5,984,195 | 17,952 61 | 2,740,073 | 3,543,215 | 6,283,288 | 18,849 87 |
| 85,704,106 | 66,076,410 | 151,780,516 | 881,597 74 | 88,047,177 | 80,243,245 | 168,290,422 | 982,260 45 |
| No. | No. | No. | | No. | No. | No. | |
| 130,963,584 | 1,315,450 | 132,279,034 | 397,099 86 | 175,489,240 | 607,060 | 176,096,240 | 530,836 22 |
| .... | 975,000 | 975,000 | 1,462 50 | .... | .... | .... | .... |
| 982,000 | .... | 982,000 | 1,473 00 | 122,000 | 217,000 | 339,000 | 508 50 |
| 131,945,584 | 2,290,450 | 134,236,034 | 400,035 36 | 175,611,240 | 824,000 | 176,435,240 | 531,344 72 |
| Lbs. | Lbs. | Lbs. | | Lbs. | Lbs. | Lbs. | |
| 666,696½ | 6,442,612½ | 7,109,309 | 1,777,327 41 | 676,495½ | 6,685,079½ | 7,361,575 | 1,840,393 95 |
| 2,731,051 | 200,992 | 2,932,043 | 146,640 32 | 3,048,926 | 102,798½ | 3,151,724½ | 157,586 17 |
| 713,156 | 569,650 | 1,282,806 | 64,102 24 | 1,011,933½ | 758,833½ | 1,770,767 | 88,538 48 |
| 173,188 | .... | 173,188 | 31,635 70 | 170,622 | .... | 170,622 | 31,196 85 |
| .... | 72,286½ | 72,286½ | 3,614 33 | .... | 53,256 | 53,256 | 2,662 80 |
| 4,284,091½ | 7,285,541 | 11,569,632½ | 2,423,355 36 | 4,907,977 | 7,599,967½ | 12,507,944½ | 2,651,722 97 |
| .... | 10,704,961¾ | 10,704,961¾ | 1,137,279 05 | .... | 11,615,963¼ | 11,615,963¼ | 1,249,569 17 |
| .... | .... | .... | 3,560,634 41 | .... | .... | .... | 3,901,292 14 |
| .... | .... | .... | 42,881 40 | .... | .... | .... | 43,023 54 |
| .... | .... | .... | 8,762 31 | .... | .... | .... | 6,028 49 |
| .... | .... | .... | 2,500 00 | .... | .... | .... | 2,500 00 |
| .... | .... | .... | 6,600 00 | .... | .... | .... | 6,575 00 |
| .... | .... | .... | 6,200 00 | .... | .... | .... | 6,500 00 |
| .... | .... | .... | 15,762 50 | .... | .... | .... | 16,235 00 |
| .... | .... | .... | 2,944 05 | .... | .... | .... | 3,324 50 |
| .... | .... | .... | 2,425 00 | .... | .... | .... | 2,000 00 |
| .... | .... | .... | 100 00 | .... | .... | .... | 100 00 |
| .... | .... | .... | 2 00 | .... | .... | .... | 2 00 |
| .... | .... | .... | 11,220,560 78 | | | | 12,147,201 21 |

per gallon was collected and afterwards refunded on the exportation of the fulminate.

W. J. GERALD,
*Deputy Minister.*

## No. 14.—AMOUNTS deposited monthly to the credit of the Honourable the Receiver General on account of Inland Revenues during the Fiscal Year ended June 30, 1902-3.

| —— | Ontario. | Quebec. | New Brunswick. | Nova Scotia. | Prince Edward Island. | Manitoba and North-west Territories. | British Columbia. | Yukon. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| JULY :— | | | | | | | | | |
| Excise | 344,403 78 | 416,100 08 | 18,586 36 | 15,288 48 | 2,793 93 | 57,429 55 | 29,731 20 | | 884,333 38 |
| " Seizures | | 200 00 | | | | | 5 00 | | 205 00 |
| Hydraulic Rents | 1 00 | 100 00 | | | | | | | 101 00 |
| Minor Public Works | 25 00 | | | | | | | | 25 00 |
| Weights and Measures | 496 30 | 264 30 | | 60 00 | 8 35 | | | | 928 95 |
| " " Seizures | | 5 00 | | | | | | | 5 00 |
| Gas Inspection | 55 25 | | | | | | | | 55 25 |
| Electric Light Inspection | 103 25 | | | | | | 9 75 | | 113 00 |
| Methylated Spirits | 2,726 51 | 775 19 | | 140 38 | | | 59 44 | | 3,701 52 |
| Other Revenues | 2,275 50 | 470 00 | 125 00 | 205 00 | 10 00 | 190 00 | 275 00 | 1,162 75 | 4,743 25 |
| Totals | 350,086 59 | 418,014 57 | 18,711 36 | 15,693 86 | 2,842 28 | 57,619 55 | 30,080 39 | 1,162 75 | 894,211 35 |
| AUGUST :— | | | | | | | | | |
| Excise | 369,429 03 | 418,185 45 | 21,883 65 | 17,189 25 | 4,536 55 | 62,668 46 | 38,510 35 | | 932,702 74 |
| " Seizures | 10 00 | 255 30 | | | | | 300 00 | | 565 30 |
| Weights and Measures | 1,543 76 | 1,981 56 | 373 90 | 414 71 | 61 74 | 338 81 | 36 25 | | 1,750 73 |
| Gas Inspection | 1,213 25 | 517 50 | 24 50 | 18 50 | 9 00 | 38 00 | 21 25 | | 1,842 00 |
| Electric Light Inspection | 632 00 | 342 25 | 44 00 | 35 25 | | 45 75 | 145 50 | | 1,244 75 |
| " " Seizures | | 5 00 | | | | | | | 5 00 |
| Methylated Spirits | 3,530 71 | 1,797 37 | 49 41 | | | | | | 5,377 49 |
| Other Revenues | 358 00 | 115 00 | 10 00 | 60 00 | | | | 1,822 50 | 2,365 50 |
| Totals | 376,716 75 | 423,199 43 | 22,385 46 | 18,017 71 | 4,607 29 | 63,091 02 | 39,013 35 | 1,822 50 | 948,853 51 |
| SEPTEMBER :— | | | | | | | | | |
| Excise | 432,665 27 | 458,060 46 | 27,322 99 | 18,650 44 | 4,710 75 | 69,322 64 | 47,628 04 | | 1,058,360 59 |
| " Seizures | 165 00 | 100 00 | | | | | 25 00 | | 290 00 |
| Minor Public Works | | | 43 75 | | | | | | 43 75 |
| Weights and Measures | 2,040 22 | 1,705 56 | 163 65 | 169 62 | 62 88 | 530 20 | 148 95 | | 4,821 68 |
| " " Seizures | 10 00 | | | | | | | | 10 00 |
| Gas Inspection | 1,043 00 | 607 00 | 27 00 | 25 50 | | 46 00 | 36 25 | | 1,784 75 |
| Electric Light Inspection | 1,091 75 | 435 25 | 32 50 | 48 00 | | 16 75 | 38 50 | | 1,662 75 |
| " " Seizures | 5 00 | | | | | | | | 5 00 |
| Methylated Spirits | 3,594 50 | 1,784 62 | | 100 68 | | | 126 03 | | 5.605 83 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Other Revenues | 1,089 15 | 40 00 | | 35 00 | | | | 1,923 25 | 3,087 10 |
| Totals | 441,703 89 | 462,732 89 | 27,589 89 | 19,029 24 | 1,773 63 | 69,915 59 | 48,002 77 | 1,923 25 | 1,075,671 15 |
| OCTOBER :— | | | | | | | | | |
| Excise | 133,120 76 | 509,114 68 | 26,205 12 | 19,787 50 | 4,732 19 | 76,667 28 | 43,310 16 | 143 83 | 1,113,681 82 |
| " Seizures | 10 00 | 3 70 | | 50 00 | | | | | 63 70 |
| Weights and Measures | 5,010 85 | 1,527 86 | 173 70 | 220 81 | 121 95 | 929 91 | 36 30 | | 8,024 38 |
| Gas Inspection | 1,307 25 | 618 30 | 67 50 | 98 25 | 9 00 | 25 50 | 53 75 | | 2,209 55 |
| Electric Light Inspection | 1,147 50 | 452 50 | 91 50 | 21 50 | 7 75 | 92 25 | 85 50 | | 1,901 50 |
| Methylated Spirits | 4,497 15 | 2,610 62 | | 140 38 | | | 49 03 | | 7,297 18 |
| Other Revenues | 219 50 | 15 00 | | | | | | 1,865 00 | 2,099 50 |
| Totals | 445,613 01 | 514,372 66 | 26,510 82 | 20,318 44 | 4,873 89 | 77,714 94 | 43,535 01 | 2 308 83 | 1,135,277 63 |
| NOVEMBER : | | | | | | | | | |
| Excise | 400,347 74 | 464,567 18 | 24,988 12 | 22,306 15 | 5,078 47 | 82,738 84 | 33,818 05 | 2,960 56 | 1,036,835 41 |
| " Seizures | 50 60 | 10 15 | | | | | | | 60 15 |
| Minor Public Works | 26 00 | | 43 75 | | | | | | 69 75 |
| Weights and Measures | 1,893 13 | 1,626 26 | 55 90 | 265 10 | 36 70 | 696 53 | 111 25 | | 4,681 87 |
| Gas Inspection | 813 00 | 693 50 | 31 25 | 71 75 | | 64 25 | 45 00 | | 1,721 75 |
| " Seizures | 20 00 | | | | | | | | 20 00 |
| Electric Light Inspection | 704 50 | 713 75 | 58 75 | 24 25 | | 76 25 | 101 00 | | 1,684 50 |
| Methylated Spirits | 3,129 54 | 1,571 93 | | 126 53 | | 197 56 | 128 18 | | 5,453 74 |
| Other Revenues | 466 00 | 40 00 | | | | | | 901 50 | 1,407 50 |
| Totals | 407,749 91 | 469,223 07 | 25,180 77 | 22,793 78 | 5,115 17 | 83,773 13 | 34,236 48 | 3,862 06 | 1.051,934 67 |
| DECEMBER : | | | | | | | | | |
| Excise | 156,105 85 | 541,784 30 | 23,271 76 | 22,756 06 | 4,470 70 | 82,611 16 | 11,479 68 | 467 84 | 1,175,947 35 |
| " Seizures | | | | 8 07 | | | 18 59 | | 26 66 |
| Weights and Measures | 1,665 69 | 892 84 | 95 25 | 261 27 | 14 60 | 100 65 | 74 10 | | 3,407 10 |
| Gas Inspection | 1,215 75 | 608 50 | 8 50 | 40 25 | | | 7 25 | | 1,880 25 |
| Electric Light Inspection | 810 75 | 621 00 | 76 75 | 179 75 | | 103 50 | 194 75 | | 1,986 50 |
| Methylated Spirits | 3,763 89 | 1,340 47 | 15 19 | | | 95 56 | | | 5,215 11 |
| Other Revenues | 632 25 | 10 00 | | 3 00 | | | 10 00 | 755 25 | 1,110 50 |
| Totals | 464,194 18 | 548,257 11 | 23,497 45 | 23,251 10 | 4,485 30 | 83,210 87 | 11,784 37 | 1,223 09 | 1,189,903 77 |
| JANUARY : | | | | | | | | | |
| Excise | 383,429 41 | 378,815 07 | 22,373 63 | 17,763 73 | 4,788 36 | 58,870 54 | 34,641 74 | 189 13 | 900,871 61 |
| " Seizures | 5 00 | 8 75 | | | | | 13 31 | | 27 06 |
| Hydraulic Rents | 1,903 00 | 2 00 | | 16 00 | | | 14 00 | | 1,935 00 |
| Minor Public Works | 30 00 | | | | | | 1 00 | | 31 00 |
| Weights and Measures | 4,232 99 | 584 68 | 63 25 | 28 19 | 12 15 | 191 90 | 88 60 | | 5,501 76 |
| Gas Inspection | 1,069 50 | 700 25 | 72 00 | 121 25 | 13 75 | 73 75 | 104 25 | | 2,151 75 |
| Electric Light Inspection | 584 00 | 395 25 | 66 00 | | 9 25 | 121 00 | 185 75 | | 1,361 25 |
| Methylated Spirits | 1,177 89 | 1,354 93 | 47 30 | 219 05 | | | | | 5,829 17 |
| Other Revenues | 652 73 | 26 00 | 23 00 | 21 00 | | 15 00 | | 189 25 | 1,226 98 |
| Totals | 396,084 52 | 381,886 93 | 22,645 18 | 18,199 22 | 4,823 51 | 59,572 19 | 35,018 65 | 678 38 | 918,938 58 |

No. 14.—AMOUNTS deposited monthly to the credit of the Honourable the Receiver General, &c.—*Concluded.*

| — | Ontario. | Quebec. | New Brunswick. | Nova Scotia. | Prince Edward Island. | Manitoba and North-west Territories. | British Columbia. | Yukon. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| FEBRUARY :— | | | | | | | | | |
| Excise | 371,237 09 | 419,903 21 | 17,852 69 | 15,892 48 | 5,378 45 | 56,064 86 | 30,017 74 | 497 74 | 916,844 26 |
| " Seizures | | | | 100 00 | | | | | 100 00 |
| Hydraulic Rents | | | | 1 00 | | | | | 1 00 |
| Minor Public Works | 26 00 | | 43 75 | | | | | | 69 75 |
| Weights and Measures | 2,091 07 | 837 10 | 14 00 | 34 20 | 12 70 | 415 60 | 74 90 | | 3,479 57 |
| Gas Inspection | 946 75 | 593 50 | 16 50 | 42 25 | 17 50 | 43 75 | 89 75 | | 1,750 00 |
| Electric Light Inspection | 573 75 | 762 50 | 100 50 | 132 00 | 28 25 | 46 25 | 218 50 | | 1,861 75 |
| Methylated Spirits | 4,761 55 | 2,099 23 | 231 48 | | | | | | 7,092 26 |
| Other Revenues | 641 50 | 37 75 | 2 00 | 24 00 | | | 12 00 | 586 75 | 1,304 00 |
| Totals | 380,379 71 | 424,233 29 | 18,260 92 | 16,225 93 | 5,436 90 | 56,570 46 | 30,412 89 | 1,084 49 | 932,604 59 |
| MARCH : | | | | | | | | | |
| Excise | 388,405 40 | 414,750 95 | 23,045 76 | 20,110 18 | 6,020 09 | 75,166 48 | 39,129 41 | 570 25 | 967,198 52 |
| " Seizures | 5 00 | | | | | | | | 5 00 |
| Hydraulic Rents | 960 00 | 1 00 | | 1 00 | | | | | 962 00 |
| Minor Public Works | 50 00 | 225 25 | | | | | | | 275 25 |
| Weights and Measures | 1,704 87 | 1,017 86 | 16 85 | 11 70 | 14 15 | 258 25 | 31 40 | | 3,655 08 |
| " Seizures | | | | | | | 25 00 | | 25 00 |
| Gas Inspection | 1,179 50 | 645 00 | 46 75 | 80 50 | 6 75 | 33 75 | 28 00 | | 2,020 25 |
| Electric Light Inspection | 504 75 | 715 50 | 105 50 | 67 75 | 13 25 | 57 00 | 239 50 | | 1,703 25 |
| Methylated Spirits | 5,025 74 | 2,310 87 | | 244 49 | | 193 18 | 44 79 | | 7,819 07 |
| Other Revenues | 218 00 | | 5 00 | 7 00 | 12 00 | | 37 00 | 1,286 75 | 1,565 75 |
| Totals | 398,053 26 | 419,666 43 | 23,219 86 | 20,522 62 | 6,066 24 | 75,708 66 | 39,535 10 | 1,857 00 | 984,629 17 |
| APRIL : | | | | | | | | | |
| Excise | 400,446 49 | 419,827 92 | 23,379 56 | 16,435 44 | 4,416 35 | 68,196 36 | 38,792 32 | 1,435 46 | 1,002,929 90 |
| " Seizures | | 10 00 | 300 00 | | | | | | 310 00 |
| Hydraulic Rents | 30 00 | 2 00 | | | | | | | 32 00 |
| Minor Public Works | 100 00 | 106 25 | | | | | | | 206 25 |
| Weights and Measures | 4,979 70 | 1,127 03 | 9 15 | 100 55 | 15 70 | 744 60 | 63 65 | | 7,040 38 |
| Gas Inspection | 1,571 75 | 509 50 | 77 25 | 77 00 | 9 00 | 50 75 | 40 75 | | 2,336 00 |
| Electric Light Inspection | 732 50 | 336 75 | 37 25 | 94 25 | 6 00 | | 247 75 | | 1,454 50 |
| Methylated Spirits | 3,196 59 | 2,565 54 | 46 64 | 125 93 | | | | | 5,934 70 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Other Revenues | 209 25 | | 2 00 | 6 00 | | | | 976 00 | 1,193 25 |
| Totals | 411,266 28 | 451,781 99 | 23,851 85 | 16,839 17 | 4,447 05 | 68,691 71 | 39,411 47 | 2,411 46 | 1,021,436 98 |
| May: | | | | | | | | | |
| Excise | 421,521 78 | 449,964 91 | 23,506 69 | 19,134 96 | 6,731 76 | 72,826 15 | 43,551 57 | 250 00 | 1,040,487 85 |
| " Seizures | 125 00 | 17 95 | | 200 00 | | | 116 76 | | 159 71 |
| Hydraulic Rents | 1 00 | 1 00 | | | | | 1 00 | | 3 00 |
| Minor Public Works | 405 00 | 25 00 | 53 75 | | | | | | 483 75 |
| Weights and Measures | 2,020 29 | 1,936 98 | 36 72 | 70 70 | 29 20 | 548 91 | 94 45 | | 4,737 25 |
| Gas Inspection | 1,408 25 | 591 00 | 48 50 | 43 75 | 3 50 | 44 25 | 69 00 | | 2,208 25 |
| Electric Light Inspection | 575 25 | 598 75 | 120 25 | 77 25 | | 56 25 | 55 50 | | 1,483 25 |
| Methylated Spirits | 3,983 13 | 1,506 24 | 44 00 | | | 96 91 | 45 58 | | 5,675 86 |
| Other Revenues | 216 72 | | | 18 00 | | | 0 75 | 713 25 | 948 72 |
| Totals | 433,256 42 | 454,641 86 | 23,809 91 | 19,544 66 | 6,764 46 | 73,572 47 | 43,934 61 | 963 25 | 1,056,487 64 |
| June: | | | | | | | | | |
| Excise | 453,410 24 | 501,373 82 | 35,594 53 | 19,342 48 | 5,857 48 | 88,566 33 | 52,013 40 | 1,765 32 | 1,157,923 30 |
| " Seizures | | 317 35 | 400 00 | | | | | | 717 35 |
| Hydraulic Rents | 366 00 | 1 00 | | 6 00 | | | 75 00 | | 448 00 |
| Minor Public Works | 20 00 | 15 00 | | | | | | | 35 00 |
| Weights and Measures | 7,605 78 | 4,698 29 | 178 42 | 743 69 | 78 82 | 408 20 | 133 00 | | 13,846 20 |
| " " Seizures | 10 00 | | | | | | | | 10 00 |
| Gas Inspection | 3,361 25 | 1,355 50 | 103 25 | 139 00 | 9 00 | 133 75 | 75 25 | | 5,177 00 |
| Electric Light Inspection | 1,463 75 | 1,016 25 | 323 25 | 51 50 | 60 25 | 89 75 | 271 00 | | 3,275 75 |
| Methylated Spirits | 4,792 19 | 2,341 75 | | 102 93 | | | | | 7,236 87 |
| Other Revenues | 356 50 | | 15 00 | 1 00 | | | 5 00 | 3,170 75 | 3,548 25 |
| Totals | 471,385 71 | 511,118 96 | 36,614 45 | 20,386 60 | 6,005 25 | 89,198 03 | 52,572 65 | 4,936 07 | 1.192,217 72 |
| Grand total | 1,976,490 23 | 5,482,132 49 | 292,307 92 | 230,822 63 | 60,240 97 | 858,638 92 | 477,300 77 | 21,233 13 | 12,402,166 76 |

## EXCISE

### No. 15.—Comparative Monthly

| | | July. | August. | September. | October. | November. |
|---|---|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts | $ cts. | $ cts. |
| Spirits | 1901-1902 | 418,004 41 | 444,122 73 | 475,449 43 | 553,024 81 | 520,641 18 |
| | 1902-1903 | 461,778 78 | 463,136 68 | 522,155 23 | 579,236 64 | 518,642 76 |
| Increase, 1902-1903 | | 43,774 37 | 19,013 95 | 46,705 80 | 26,211 83 | |
| Decrease, 1902-1903 | | | | | | 1,998 42 |
| Malt Liquor | 1901-1902 | 5,763 00 | 400 00 | 200 00 | 119 70 | |
| | 1902-1903 | 6,275 00 | 315 00 | 100 00 | 150 00 | 142 30 |
| Increase, 1902-1903 | | 512 00 | | | 30 30 | 142 30 |
| Decrease, 1902-1903 | | | 85 00 | 100 00 | | |
| Malt | 1901-1902 | 89,750 77 | 83,599 86 | 86,040 79 | 90,659 67 | 93,796 80 |
| | 1902-1903 | 81,817 94 | 73,860 19 | 86,782 40 | 88,049 84 | 81,829 68 |
| Increase, 1902-1903 | | | | 741 61 | | |
| Decrease, 1902-1903 | | 7,932 83 | 9,739 67 | | 2,609 83 | 11,967 12 |
| Tobacco | 1901-1902 | 280,531 88 | 309,629 47 | 283,569 82 | 334,919 47 | 313,297 04 |
| | 1902-1903 | 340,176 36 | 319,059 13 | 353,722 89 | 353,400 81 | 325,417 97 |
| Increase, 1902-1903 | | 59,644 48 | 9,429 66 | 70,153 07 | 18,481 34 | 12,120 93 |
| Decrease, 1902-1903 | | | | | | |
| Cigars | 1901-1902 | 88,065 86 | 74,304 77 | 72,305 99 | 76,643 89 | 73,254 03 |
| | 1902-1903 | 98,273 10 | 82,877 23 | 82,990 17 | 89,016 90 | 86,841 75 |
| Increase, 1902-1903 | | 10,207 24 | 8,572 46 | 10,684 18 | 12,373 01 | 13,587 72 |
| Decrease, 1902-1903 | | | | | | |
| Acetic Acid | 1901-1902 | 929 87 | 84 73 | 497 94 | 50 00 | 1,937 52 |
| | 1902-1903 | 1,200 49 | 269 61 | 1,429 62 | 182 12 | |
| Increase, 1902-1903 | | 270 62 | 184 88 | 931 68 | 132 12 | |
| Decrease, 1902-1903 | | | | | | 1,937 52 |
| Manufactures in bond. | 1901-1902 | 4,187 74 | 4,889 99 | 6,019 83 | 5,997 74 | 3,755 91 |
| | 1902-1903 | 3,894 46 | 4,993 34 | 6,280 54 | 6,734 03 | 3,490 12 |
| Increase, 1902-1903 | | | 103 35 | 260 71 | 736 29 | |
| Decrease, 1902-1903 | | 293 28 | | | | 265 79 |
| Seizures | 1901-1902 | 350 00 | | 5 00 | | 50 00 |
| | 1902-1903 | 505 00 | 265 30 | 343 70 | 10 00 | 60 15 |
| Increase, 1902-1903 | | 155 00 | 265 30 | 338 70 | 10 00 | 10 15 |
| Decrease, 1902-1903 | | | | | | |
| Other receipts | 1901-1902 | 11,921 6 | 2,492 20 | 1,840 08 | 2,111 59 | 1,942 46 |
| | 1902-1903 | 13,995 91 | 1,101 43 | 1,610 97 | 3,472 57 | 2,772 76 |
| Increase, 1902-1903 | | 2,074 28 | | | 1,360 98 | 830 30 |
| Decrease, 1902-1903 | | | 1,390 77 | 229 11 | | |
| Total Revenue, 1901-1902 | | 899,505 16 | 919,523 75 | 925,928 88 | 1,063,526 87 | 1,008,674 94 |
| " 1902-1903 | | 1,007,917 04 | 945,877 91 | 1,055,415 52 | 1,120,252 91 | 1,019,197 49 |
| Total Increase, 1902-1903 | | 108,411 88 | 26,354 16 | 129,486 64 | 56,726 04 | 10,522 55 |
| " Decrease, 1902-1903 | | | | | | |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## REVENUE.

Statement, 1901–1902 and 1902–1903.

| December. | January. | February. | March. | April. | May. | June. | Totals. |
|---|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 676,881 73 | 408,858 85 | 393,059 83 | 376,589 33 | 474,053 88 | 437,414 92 | 442,511 88 | 5,620,612 98 |
| 753,694 53 | 447,226 31 | 458,788 66 | 462,967 56 | 503,265 69 | 511,206 55 | 480,727 50 | 6,162,826 89 |
| 76,812 80 | 38,367 46 | 65,728 83 | 86,378 23 | 29,211 81 | 73,791 63 | 38,215 62 | 542,213 91 |
| .... | .... | .... | .... | .... | .... | .... | .... |
| 50 00 | 75 00 | 25 00 | 207 00 | .... |  130 00 | .... | 6,969 70 |
| 50 00 | 145 00 | 75 00 | 492 00 | 495 00 | 708 60 | 537 30 | 9,485 20 |
| .... | .... | 50 00 | 285 00 | 495 00 | 578 60 | 537 30 | 2,515 50 |
| .... | 70 00 | .... | .... | .... | .... | .... | .... |
| 85,668 44 | 85,450 98 | 81,900 03 | 92,750 17 | 112,233 63 | 97,513 21 | 78,444 39 | 1,077,808 74 |
| 75 523 98 | 76,641 59 | 77,875 21 | 89,301 42 | 96,882 14 | 95,282 77 | 96,775 84 | 1,020,623 00 |
| .... | .... | .... | .... | .... | .... | 18,331 45 | .... |
| 10,144 46 | 8,809 39 | 4,024 82 | 3,448 75 | 15,351 49 | 2,230 44 | .... | 57,185 74 |
| 268,333 92 | 280,629 91 | 274,692 36 | 289,368 13 | 327,860 41 | 308,902 69 | 291,843 31 | 3,563,578 41 |
| 270,819 71 | 293,409 22 | 317,645 82 | 325,856 72 | 332,846 88 | 321,711 09 | 350,550 04 | 3,904,616 64 |
| 2,485 79 | 12,779 31 | 42,953 46 | 36,488 59 | 4,986 47 | 12,808 40 | 58,706 75 | 341,038 23 |
| .... | .... | .... | .... | .... | .... | .... | .... |
| 77,771 43 | 60,945 77 | 61,263 84 | 64,417 61 | 82,743 16 | 82,682 66 | 82,961 23 | 897,360 24 |
| 77,125 94 | 65,268 25 | 67,594 31 | 75,923 19 | 87,577 62 | 88,986 07 | 96,020 92 | 998,495 45 |
| .... | 4,322 48 | 6,330 47 | 11,505 58 | 4,834 46 | 6,303 41 | 13,059 69 | 101,135 21 |
| 645 49 | .... | .... | .... | .... | .... | .... | .... |
| 1,631 21 | 1,089 76 | .... | .... | 477 11 | 147 17 | 2,017 00 | 8,862 31 |
| 43 76 | .... | 333 38 | .... | .... | 1,698 15 | 971 36 | 6,128 49 |
| .... | .... | 333 38 | .... | .... | 1,550 98 | .... | .... |
| 1 587 45 | 1,089 76 | .... | .... | 477 11 | .... | 1,045 64 | 2,733 82 |
| 2,224 50 | 1,135 50 | 1,738 44 | 2,313 26 | 3,944 35 | 4,833 14 | 4,266 00 | 45,306 40 |
| 2,379 41 | 1,195 10 | 2,421 36 | 2,372 92 | 3,096 49 | 4,209 93 | 3,955 84 | 45,023 54 |
| 154 91 | 59 60 | 682 92 | 59 66 | .... | .... | .... | .... |
| .... | .... | .... | .... | 847 86 | 623 21 | 310 16 | 282 86 |
| 31 20 | 285 00 | 163 25 | 262 48 | 194 15 | .... | 225 90 | 1,566 98 |
| 26 66 | 27 06 | 100 00 | 5 00 | 426 76 | 342 95 | 717 35 | 2,829 93 |
| .... | .... | .... | .... | 232 61 | 342 95 | 491 45 | 1,262 95 |
| 4 54 | 257 94 | 63 25 | 257 48 | .... | .... | .... | .... |
| 2,474 06 | 2,125 83 | 1,839 84 | 2,326 62 | 1,963 13 | 2,708 23 | 1,673 20 | 35,418 87 |
| 3,560 20 | 2,020 61 | 2,124 03 | 2,680 46 | 2,474 84 | 1,544 63 | 2,735 27 | 40,093 68 |
| 1,086 14 | .... | 284 19 | 353 84 | 511 71 | .... | 1,062 07 | 4,674 81 |
| .... | 195 22 | .... | .... | .... | 1,163 60 | .... | .... |
| 1,115,066 49 | 840,596 60 | 814,682 59 | 828,234 60 | 1,003,469 82 | 934,332 02 | 903,942 91 | 11,257,484 63 |
| 1,183,224 19 | 885,933 14 | 926,957 77 | 959,599 27 | 1,027,065 42 | 1,025,690 74 | 1,032,991 42 | 12,190,122 82 |
| 68,157 70 | 45,336 54 | 112,275 18 | 131,364 67 | 23,595 60 | 91,358 72 | 129,048 51 | 932,638 19 |
| .... | .... | .... | .... | .... | .... | .... | .... |

W. J. GERALD,
*Deputy Minister.*

## No. 16.—Refunds of Revenue during the Fiscal Year ended June 30, 1903.

### EXCISE.

| Articles. | To whom paid. | Date. | | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|---|
| | | 1902. | | | | $ cts. | $ cts. |
| Spirits | Swift, E. G | July | 25 | Windsor | Refunded under Revised Statutes, cap. 34, sec. 238 | 788 79 | |
| | " | Aug. | 12 | " | " " 34 " 238 | 208 19 | |
| | " | " | 23 | " | " " 34 " 238 | 585 39 | |
| | " | " | 29 | " | " " 34 " 238 | 160 32 | |
| | " | " | 29 | " | " " 34 " 238 | 139 06 | |
| | " | " | 29 | " | " " 34 " 238 | 88 82 | |
| | " | Sept. | 4 | " | " " 34 " 238 | 96 74 | |
| | " | " | 23 | " | " " 34 " 238 | 172 01 | |
| | " | Oct. | 3 | " | " " 34 " 238 | 150 78 | |
| | " | " | 4 | " | " " 34 " 238 | 10 41 | |
| | Eastern Townships Bank | " | 7 | Sherbrooke | " " 34 " 238 | 9,427 44 | |
| | Swift, E. G | " | 11 | Windsor | " " 34 " 238 | 731 22 | |
| | Heney, J. J | " | 13 | Prescott | " " 34 " 238 | 13,459 45 | |
| | Hiram Walker & Sons, Ltd. | " | 18 | Windsor | " " 34 " 238 | 564 04 | |
| | Swift, E. G | " | 21 | " | " " 34 " 238 | 51 19 | |
| | " | " | 29 | " | " " 34 " 238 | 120 95 | |
| | " | Nov. | 3 | " | " " 34 " 238 | 41 88 | |
| | " | " | 14 | " | " " 34 " 238 | 9 33 | |
| | " | " | 18 | " | " " 34 " 238 | 268 49 | |
| | " | " | 18 | " | " " 34 " 238 | 43 53 | |
| | King, H. L | " | 22 | " | " " 34 " 238 | 1,159 86 | |
| | Swift, E. G | " | 25 | " | " " 34 " 238 | 136 67 | |
| | " | Dec. | 3 | " | " " 34 " 238 | 127 72 | |
| | " | " | 10 | " | " " 34 " 238 | 164 37 | |
| | " | " | 17 | " | " " 34 " 238 | 122 93 | |
| | " | " | 22 | " | " " 34 " 238 | 122 42 | |
| | " | " | 29 | " | " " 34 " 238 | 27 70 | |
| | | 1903. | | | | | |
| | " | Jan. | 5 | " | " " 34 " 238 | 270 65 | |
| | " | " | 8 | " | " " 34 " 238 | 69 27 | |
| | " | " | 21 | " | " " 34 " 238 | 271 35 | |
| | " | Feb. | 6 | " | " " 34 " 238 | 123 82 | |
| | " | " | 10 | " | " " 34 " 238 | 73 34 | |
| | " | " | 20 | " | " " 34 " 238 | 174 89 | |
| | " | " | 27 | " | " " 34 " 238 | 117 59 | |
| | " | Mar. | 7 | " | " " 34 " 238 | 451 97 | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hamilton, J. S. & Co. | " | 16 | Brantford | " | " | 34 | " | 238 | 97 96 | |
| | Swift, E. G | " | 21 | Windsor | " | " | 34 | " | 238 | 268 93 | |
| | " | April | 1 | " | " | " | 34 | " | 238 | 878 52 | |
| | " | " | 1 | " | " | " | 34 | " | 228 | 7 00 | |
| | " | " | 4 | " | " | " | 34 | " | 238 | 301 85 | |
| | " | " | 7 | " | " | " | 34 | " | 238 | 347 95 | |
| | " | " | 24 | " | " | " | 34 | " | 238 | 83 85 | |
| | " | " | 27 | " | " | " | 34 | " | 238 | 192 70 | |
| | Eastern Townships Bank | " | 28 | Sherbrooke | " | " | 34 | " | 238 | 7,747 92 | |
| | Swift, E. G | May | 1 | Windsor | " | " | 34 | " | 238 | 162 70 | |
| | " | " | 7 | " | " | " | 34 | " | 238 | 591 81 | |
| | Heney, J. J | " | 8 | Prescott | " | " | 34 | " | 238 | 13,458 85 | |
| | Swift, E. G | " | 15 | Windsor | " | " | 34 | " | 238 | 3 97 | |
| | " | " | 19 | " | " | " | 34 | " | 238 | 80 94 | |
| | Heney, J. J | " | 20 | Prescott | " | " | 34 | " | 238 | 13,366 91 | |
| | Swift, E. G | " | 22 | Windsor | " | " | 34 | " | 238 | 21 26 | |
| | " | " | 28 | " | " | " | 34 | " | 238 | 332 26 | |
| | Heney, J. J | " | 28 | Prescott | " | " | 34 | " | 238 | 8,749 67 | |
| | King, H. L | " | 28 | Windsor | " | " | 34 | " | 238 | 1,173 82 | |
| | Swift, E. G | June | 5 | " | " | " | 34 | " | 238 | 83 24 | |
| | " | " | 12 | " | " | " | 34 | " | 238 | 42 81 | |
| | " | " | 12 | " | " | " | 34 | " | 238 | 66 54 | |
| | " | July | 6 | " | " | " | 34 | " | 238 | 270 18 | |
| | " | " | 11 | " | " | " | 34 | " | 238 | 109 86 | |
| | " | " | 21 | " | " | " | 34 | " | 238 | 18 05 | |
| | | | | | | | | | | | 78,992 13 |
| | | 1902 | | | | | | | | | |
| Malt | Roy, J. A | July | 23 | Belleville | " | " | 29 | " | 78 | 202 11 | |
| | Bixel, A | " | 23 | Brantford | " | " | 29 | " | 78 | 365 02 | |
| | Luke, C | " | 23 | " | " | " | 29 | " | 78 | 110 48 | |
| | Otterbein, C | " | 23 | " | " | " | 29 | " | 78 | 123 39 | |
| | Clark, L. H | " | 23 | Kingston | " | " | 29 | " | 78 | 1,620 00 | |
| | Fisher, John | " | 23 | " | " | " | 29 | " | 78 | 234 02 | |
| | Stevenson, Thos. | " | 23 | " | " | " | 29 | " | 78 | 179 28 | |
| | Rudolph, Henry | " | 23 | London | " | " | 29 | " | 78 | 84 24 | |
| | O'Dwyer, P. | " | 23 | " | " | " | 29 | " | 78 | 234 00 | |
| | Labatt, John | " | 23 | " | " | " | 29 | " | 78 | 1,380 92 | |
| | Carling, T. H | " | 23 | " | " | " | 29 | " | 78 | 1,899 85 | |
| | Schwan, W. | " | 23 | Owen Sound | " | " | 29 | " | 78 | 163 95 | |
| | Huether, W | " | 23 | " | " | " | 29 | " | 78 | 195 60 | |
| | Eaton, C. | " | 23 | " | " | " | 29 | " | 78 | 224 46 | |
| | Heisz, L | " | 23 | Windsor | " | " | 29 | " | 78 | 113 29 | |
| | Farquharson & Grainger | " | 23 | " | " | " | 29 | " | 78 | 111 00 | |
| | Calcutt, H. | " | 23 | Peterborough | " | " | 29 | " | 78 | 273 35 | |
| | Clark, L. H | " | 23 | Kingston | " | " | 29 | " | 78 | 2,317 25 | |
| | Watson, John | " | 23 | Stratford | " | " | 29 | " | 78 | 177 82 | |
| | King, R. | " | 23 | Owen Sound | " | " | 29 | " | 78 | 27 60 | |
| | Kuntz, Jacob. | " | 23 | Stratford | " | " | 29 | " | 78 | 84 00 | |
| | Devlin F. | " | 23 | " | " | " | 29 | " | 78 | 74 18 | |
| | Orillia Brewing Co., The | " | 23 | Toronto | " | " | 29 | " | 78 | 44 30 | |

## No. 16.—Refunds of Revenue—*Continued.*

EXCISE—*Continued.*

| Articles. | To whom paid. | Date. | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|
| | | 1902. | | | $ cts. | $ cts. |
| Malt—*Con* | Anderton & Co | July 21 | Toronto | Refunded under Revised Statutes, cap. 29, sec. 78 | 78 80 | |
| | Reinhardt, L. | " 21 | " | " " 29 " 78 | 1,589 39 | |
| | Anderton & Co. | " 21 | " | " " 29 " 78 | 91 51 | |
| | Anderton, W. A | " 21 | " | " " 29 " 78 | 97 12 | |
| | Toronto Brew. and Malt. Co. | " 21 | " | " " 29 " 78 | 1,008 75 | |
| | Taylor, T. B | " 21 | " | " " 29 " 78 | 1,300 14 | |
| | Gooderham, W. J | " 21 | " | " " 29 " 78 | 504 75 | |
| | Ross, W | " 21 | " | " " 29 " 78 | 1,918 78 | |
| | O'Keefe, Eugène | " 21 | " | " " 29 " 78 | 2,058 48 | |
| | Cosgrove, L. J | " 21 | " | " " 29 " 78 | 1,145 98 | |
| | Brain, Edwin | " 21 | " | " " 29 " 78 | 182 02 | |
| | Boswell Bros | " 21 | Quebec | " " 29 " 78 | 1,250 16 | |
| | Amyot & Gauvin | " 21 | " | " " 29 " 78 | 810 00 | |
| | Curren, A. E | " 21 | Charlottetown | " " 29 " 78 | 197 28 | |
| | Huether, C. N | " 25 | Guelph | " " 29 " 78 | 466 87 | |
| | Bernhardt, P | " 25 | " | " " 29 " 78 | 194 55 | |
| | Bauer, A | " 25 | " | " " 29 " 78 | 1,231 46 | |
| | Sleeman, G | " 25 | " | " " 29 " 78 | 1,050 00 | |
| | Seagram, J. E | " 25 | " | " " 29 " 78 | 54 00 | |
| | Rau, Mary | " 25 | " | " " 29 " 78 | 204 75 | |
| | Holliday, Thos | " 25 | " | " " 29 " 78 | 552 87 | |
| | Wilson, M. S | " 25 | Hamilton | " " 29 " 78 | 2,170 80 | |
| | Grant's Spring B. Co | " 25 | " | " " 29 " 78 | 1,023 30 | |
| | Steel, J. J | " 25 | " | " " 29 " 78 | 371 02 | |
| | Dow & Co., W | " 25 | Montreal | " " 29 " 78 | 3,264 12 | |
| | Dawes, A. J | " 25 | " | " " 29 " 78 | 2,910 96 | |
| | Clarke, E. C | " 25 | " | " " 29 " 78 | 909 92 | |
| | Reinhardt, C. S | " 25 | " | " " 29 " 78 | 326 70 | |
| | Montreal B. Co | " 25 | " | " " 29 " 78 | 27 00 | |
| | Reinhardt, L., jr | " 25 | " | " " 29 " 78 | 720 00 | |
| | Cloutier, D | " 25 | " | " " 29 " 78 | 22 50 | |
| | Mace, T. F | " 25 | " | " " 29 " 78 | 72 37 | |
| | Drewry, E. C | " 25 | Winnipeg | " " 29 " 78 | 824 36 | |
| | Shea, P | " 25 | " | " " 29 " 78 | 451 39 | |
| | Blackwood, W | " 25 | " | " " 29 " 78 | 112 74 | |
| | Robinson, J. A | " 25 | " | " " 29 " 78 | 57 00 | |
| | Witteman, K | " 25 | " | " " 29 " 78 | 27 40 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Schwartz, W. | " | 25 | " | " | " | 29 | " | 78 | 28 09 |
| Capital Brew. Co., The | " | 25 | Ottawa | " | " | 29 | " | 78 | 356 36 |
| Hull B. & M. Co | " | 25 | " | " | " | 29 | " | 78 | 44 70 |
| Irion, A. L. | " | 25 | Windsor | " | " | 29 | " | 78 | 577 50 |
| Hiram Walker & Sons, Ltd. | " | 25 | " | " | " | 29 | " | 78 | 1,771 88 |
| Walkerville Brew. Co., Ltd. | " | 25 | " | " | " | 29 | " | 78 | 27 00 |
| Schoenith, G | " | 25 | " | " | " | 29 | " | 78 | 8 40 |
| Oelmer, Robt | " | 25 | Calgary | " | " | 29 | " | 78 | 69 30 |
| Cross, A. E. | " | 25 | " | " | " | 29 | " | 78 | 478 29 |
| Downer, J. R | " | 25 | Winnipeg | " | " | 29 | " | 78 | 1 95 |
| Wickwire, W. N. | " | 25 | Montreal | " | " | 34 | " | 238 | 141 88 |
| McCarthy, D. J. | " | 28 | Prescott | " | " | 29 | " | 78 | 563 30 |
| Ready, James | " | 28 | St. John | " | " | 29 | " | 78 | 800 04 |
| Jones, Simeon, Ltd | " | 28 | " | " | " | 29 | " | 78 | 157 50 |
| Gowen, E. N | " | 28 | Victoria | " | " | 29 | " | 78 | 18 00 |
| Beauport Brew. Co | " | 28 | Quebec | " | " | 29 | " | 78 | 675 00 |
| Union Brew. Co. | " | 28 | Victoria | " | " | 29 | " | 78 | 117 00 |
| Ambrose, T. H | Aug. | 5 | Peterborough | " | " | 29 | " | 78 | 309 73 |
| Taylor, A. J. | " | 5 | St. Catharines | " | " | 29 | " | 78 | 631 44 |
| Silver Spring Brewery | " | 5 | Sherbrooke | " | " | 29 | " | 78 | 1,245 46 |
| Schoenith, Geo | " | 5 | Windsor | " | " | 29 | " | 78 | 6 90 |
| Carling, T. H | " | 22 | London | " | " | 34 | " | 178 | 4 80 |
| Proteau & Carignan | Sept. | 6 | Quebec | " | " | 34 | " | 238 | 52 50 |
| Sleeman, G | " | 6 | Guelph | " | " | 34 | " | 238 | 286 49 |
| Wiser, J. P. | " | 6 | Prescott | " | " | 29 | " | 78 | 170 25 |
| Bowie, Robt | " | 6 | " | " | " | 29 | " | 78 | 281 64 |
| White, T. F. | " | 6 | St. Catharines | " | " | 29 | " | 78 | 250 80 |
| Proteau & Carignan | " | 6 | Quebec | " | " | 29 | " | 78 | 350 25 |
| Wickwire, W. N. | " | 6 | Halifax | " | " | 29 | " | 78 | 1,383 80 |
| May, J. P | " | 6 | " | " | " | 29 | " | 78 | 227 10 |
| Fort Steel B. Co. | " | 6 | Vancouver | " | " | 29 | " | 78 | 145 61 |
| Henderson, H | " | 6 | " | " | " | 29 | " | 78 | 12 82 |
| Lion Brew. Co. | " | 6 | " | " | " | 29 | " | 78 | 7 49 |
| Imperial Brew. Co | " | 12 | " | " | " | 34 | " | 178 | 70 05 |
| Curren, A. E | " | 16 | Halifax | " | " | 29 | " | 78 | 205 05 |
| Labatt, John | " | 18 | London | " | " | 34 | " | 178 | 16 65 |
| Curren, A. E. | " | 20 | Halifax | " | " | 29 | " | 78 | 243 00 |
| Carling, T. H | Oct. | 3 | London | " | " | 34 | " | 178 | 3 22 |
| Wickwire, W. N. | " | 3 | Halifax | " | " | 34 | " | 238 | 760 83 |
| Curren, A. E. | " | 3 | " | " | " | 34 | " | 238 | 16 68 |
| May, L. A | " | 3 | " | " | " | 34 | " | 238 | 39 34 |
| Gowen, E. W. | " | 3 | Victoria | " | " | 34 | " | 238 | 5 26 |
| Victoria Phœnix B. Co | " | 3 | " | " | " | 34 | " | 238 | 437 85 |
| Amyot & Gauvin | " | 18 | Quebec | " | " | 34 | " | 238 | 104 85 |
| Wilson, D. H. | Nov. | 3 | Toronto | " | " | 34 | " | 178 | 503 05 |
| McCarthy, D. J | " | 20 | Prescott | " | " | 29 | " | 78 | 26 00 |
| Grant's Spring B. Co | " | 20 | Hamilton | " | " | 34 | " | 178 | 224 95 |
| McCarthy, D. J | Dec. | 21 | Prescott | " | " | 34 | " | 238 | 28 71 |
| " | " | 21 | " | " | " | 34 | " | 238 | 47 21 |
| Holliday, Thomas (estate of) | " | 21 | Guelph | " | " | 34 | " | 238 | 50 00 |

## No. 16.—Refunds of Revenue—*Continued.*

EXCISE—*Continued.*

| Articles. | To whom paid. | Date. | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|
| | | 1903. | | | $ cts. | $ cts. |
| Malt—*Con.* | Superior B. & M. Co., Ltd. | Jan. 2 | Port Arthur | Refunded under Revised Statutes, cap. 29, sec. 78 | 229 96 | |
| | Curren, A. E. | ″ 5 | Halifax | ″ ″ 34 ″ 238 | 2 22 | |
| | Oland, G. W. C. | ″ 5 | ″ | ″ ″ 34 ″ 238 | 6 11 | |
| | Wickwire, W. N. | ″ 5 | ″ | ″ ″ 34 ″ 238 | 1,485 94 | |
| | Victoria Phœnix B. Co. | ″ 5 | Victoria | ″ ″ 34 ″ 238 | 299 91 | |
| | Vancouver Breweries, Ltd. | ″ 8 | Vancouver | ″ ″ 34 ″ 238 | 30 75 | |
| | Sleeman B. & M. Co., The. | Feb. 5 | Guelph | ″ ″ 34 ″ 238 | 823 20 | |
| | Vancouver Breweries, Ltd. | ″ 21 | Vancouver | ″ ″ 34 ″ 238 | 30 45 | |
| | Labatt, John | Mar. 24 | London | ″ ″ 34 ″ 178 | 25 13 | |
| | Nelson, Nels | April 21 | Vancouver | ″ ″ 34 ″ 238 | 112 50 | |
| | Vancouver Breweries, Ltd. | ″ 21 | ″ | ″ ″ 34 ″ 238 | 66 00 | |
| | Nelson, Nels | May 13 | ″ | ″ ″ 34 ″ 238 | 143 85 | |
| | McCarthy, D. J. | ″ 27 | Prescott | ″ ″ 34 ″ 238 | 27 20 | |
| | Ready, James | ″ 27 | St. John | ″ ″ 34 ″ 238 | 2,853 84 | |
| | Dawes, A. J. | June 10 | Montreal | ″ ″ 34 ″ 178 | 43 20 | |
| | Carling, T. H. | July 8 | London | ″ ″ 34 ″ 178 | 4 31 | |
| | Wickwire, W. N. | ″ 8 | Halifax | ″ ″ 34 ″ 178 | 3,348 78 | |
| | Oland, G. W. C. | ″ 8 | ″ | ″ ″ 34 ″ 178 | 13 97 | |
| | Victoria Phœnix B. Co. | ″ 8 | Victoria | ″ ″ 34 ″ 178 | 878 46 | |
| | Nelson, Nels | ″ 14 | Vancouver | ″ ″ 34 ″ 238 | 213 00 | |
| | Vancouver Breweries, Ltd. | ″ 14 | ″ | ″ ″ 34 ″ 238 | 56 73 | |
| | McCarthy, D. J. | ″ 14 | Prescott | ″ ″ 29 ″ 78 | 37 97 | |
| | Toronto M. & B. Co. | ″ 14 | Toronto | ″ ″ 29 ″ 78 | 917 03 | |
| | Tate, Robt | ″ 22 | Victoria | ″ ″ 34 ″ 238 | 57 38 | |
| | Roy, J. A. | ″ 23 | Belleville | ″ ″ 29 ″ 78 | 207 39 | |
| | Corby, H. | ″ 23 | ″ | ″ ″ 29 ″ 78 | 27 00 | |
| | Bixel, A. | ″ 23 | Brantford | ″ ″ 29 ″ 78 | 358 05 | |
| | Otterbein, C. | ″ 23 | ″ | ″ ″ 29 ″ 78 | 105 73 | |
| | Luke, C. | ″ 23 | ″ | ″ ″ 29 ″ 78 | 101 51 | |
| | Clarke, L. H. | ″ 23 | Kingston | ″ ″ 29 ″ 78 | 1,308 87 | |
| | Fisher, John | ″ 23 | Halifax | ″ ″ 29 ″ 78 | 229 05 | |
| | Stevenson, Thos. | ″ 23 | Kingston | ″ ″ 29 ″ 78 | 143 62 | |
| | Carling, T. H. | ″ 23 | London | ″ ″ 29 ″ 78 | 1,681 18 | |
| | Labatt, John | ″ 23 | ″ | ″ ″ 29 ″ 78 | 1,487 91 | |
| | O'Dwyer, P. | ″ 23 | ″ | ″ ″ 29 ″ 78 | 229 65 | |
| | Heuser, Peter | ″ 23 | ″ | ″ ″ 29 ″ 78 | 13 80 | |
| | Rudolph, H. | ″ 23 | ″ | ″ 29 ″ 78 | 3 90 | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Capital Brewing Co., The.. | " | 23.. | Ottawa .... .... | " | " | 29 | " | 78 .. | 329 78 | |
| | Hull B. & M. Co .... ... | " | 23.. | " .......... | " | " | 29 | " | 78..... | 118 15 | |
| | Eaton, Chrs. .......... | " | 23 . | Owen Sound..... | " | " | 29 | " | 78 ... | 320 66 | |
| | Heuther, W. ..... .... | " | 23.. | " ..... | " | " | 29 | " | 78 ... | 215 70 | |
| | Schwan, W............. | " | 23.. | " ... | " | " | 29 | " | 78 ... | 194 55 | |
| | Heisz, L .... ... ...... | " | 23.. | " ..... | " | " | 29 | " | 78 .... | 119 94 | |
| | Farquharson & Granger... | " | 23 | " ..... | " | " | 29 | " | 78 ... | 111 00 | |
| | Schwan, David ....... | " | 23.. | " .... | " | " | 29 | " | 78...... | 16 20 | |
| | Superior B. & M. Co. .... | " | 23 . | Port Arthur..... | " | " | 29 | " | 78...... | 121 91 | |
| | Clarke, L. H ..... .... | " | 23.. | Stratford. .... ... | " | " | 29 | " | 78.... ... | 1,628 15 | |
| | Watson, John.... .... ... | " | 23.. | " ........ | " | " | 29 | " | 78...... | 159 71 | |
| | Devlin, Felix......... ... | " | 23.. | " ....... | " | " | 29 | " | 78 ..... | 71 17 | |
| | Buxton, Geo.. ....... . . | " | 23.. | " ....... | " | " | 29 | " | 78: . . | 60 75 | |
| | Kuntz, Jacob.... ....... | " | 23.. | " . . . . . . | " | " | 29 | " | 78 ..... | 33 00 | |
| | O'Keefe, Eugene.... . | " | 23.. | Toronto .. ....... | " | " | 29 | " | 78..... | 1,994 19 | |
| | Taylor, T. B .... .... | " | 23.. | " ... ..... | " | " | 29 | " | 78.... | 1,940 25 | |
| | Reinhardt, L.... .... ... | " | 23.. | " ... ..... | " | " | 29 | " | 78 . | 1,476 60 | |
| | Ross, W. . ....... .. | " | 23.. | " ........ | " | " | 29 | " | 78 .... | 1,423 31 | |
| | Cosgrove, L. J.......... | " | 23.. | " ...... ... | " | " | 29 | " | 78 .... | 1,109 82 | |
| | Toronto B. & M. Co.. . . . | " | 23.. | " ...... | " | " | 29 | " | 78 .. | 854 85 | |
| | Gooderham, W. G. . . . . | " | 23.. | " ..... .. | " | " | 29 | " | 78..... | 541 38 | |
| | Brain, Edwin....... ... | " | 23.. | " ....... ... | " | " | 29 | " | 78..... | 163 12 | |
| | Anderton & Co. ..... | " | 23.. | " ..... . . | " | " | 29 | " | 78...... | 133 19 | |
| | Anderton, W. A. ....... | " | 23.. | " .......... | " | " | 29 | " | 78...... | 64 37 | |
| | Whitney, A ......... .... | " | 23.. | " ... ...... | " | " | 29 | " | 78 .. | 39 15 | |
| | Hiram Walker & Sons, Ltd. | " | 23. | Windsor. ........ | " | " | 29 | " | 78 . . | 1,740 90 | |
| | Irion, A. L............... | " | 23.. | " ......... | " | " | 29 | " | 78 .. | 493 50 | |
| | Schoenith, Geo ......... | " | 23.. | " . ..... | " | " | 29 | " | 78...... | 29 70 | |
| | Silver Spring Brewery, Ltd. | " | 23.. | Sherbrooke....... | " | " | 29 | " | 78 ... | 1,022 85 | |
| | Wickwire, W. N........ .. | " | 23.. | Halifax......... | " | " | 29 | " | 78 .... | 1,386 00 | |
| | Oland, Geo. W. C. ....... | " | 23.. | " ......... | " | " | 29 | " | 78. ... | 384 43 | |
| | May, L. A .... ......... | " | 23 . | " ...... .. | " | " | 29 | " | 78 .... | 215 70 | |
| | Curren, A. E ... ...... ... | " | 23.. | " ........ | " | " | 29 | " | 78...... | 43 03 | |
| | " ......... .. | " | 23.. | " ....... | " | " | 29 | " | 78 .... | 43 47 | |
| | Oland, G. W. C. .... .... | " | 23.. | " .. ....... | " | " | 29 | " | 78.... | 27 00 | |
| | Drewry, E. L............ | " | 23 . | Winnipeg........ | " | " | 29 | " | 78 . | 1,061 32 | |
| | Shea, P................. | " | 23.. | " ..... .. | " | " | 29 | " | 78 ..... | 557 90 | |
| | Blackwood, W. .... ...... | " | 23.. | " ...... | " | " | 29 | " | 78 .... | 111 13 | |
| | Robinson, J. A ..... .... | " | 23.. | " ... .... | " | " | 29 | " | 78...... | 58 12 | |
| | Witteman, R .. .. . ..... | " | 23.. | " .. .. .. | " | " | 29 | " | 78..... | 56 25 | |
| | Brandon Brewing Co., The. | " | 23.. | " ........ | " | " | 29 | " | 78 . . | 29 32 | |
| | Schwartz, W.. .. ....... | " | 23.. | " ...... | " | " | 29 | " | 78 .... | 5 42 | |
| | Wilson, M. S.... ... .... | " | 23 | Hamilton .... ... | " | " | 29 | " | 78 ... | 2,111 27 | |
| | Steele, J. J.: ........ ... | " | 23.. | " ..... | " | " | 29 | " | 78 . ... | 144 13 | |
| | Grant's Spring Brewing Co. | " | 23.. | " .. .. .. | " | " | 29 | " | 78. ... | 863 56 | |
| | Nelson, Nels ............ | " | 23.. | Vancouver . . ... | " | " | 34 | " | 238 ... | 241 50 | |
| | Wilson, D. H....... . | " | 30.. | Toronto ... . .... | " | " | 34 | " | 178 . .. | 605 73 | |
| | | | | | | | | | | | 95,889 43 |
| | | 1902. | | | | | | | | | |
| Malt liquor ....... | Holliday, Thos. (estate of).. | Déc. | 24.. | Guelph ... .... | ... ....... . ....... . | .... ... . . . | | | | 50 00 | |
| | | | | | | | | | | | 50 00 |

## No. 16.—Refunds of Revenue—*Continued.*

### EXCISE—*Continued.*

| Articles. | To whom paid. | Date. | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|
| | | 1902. | | | $ cts. | $ cts. |
| Tobacco | American Tobacco Co., Ltd., The | July 21 | Montreal | Refunded under Revised Statutes, cap. 34, sec. 238 | 154 70 | |
| | Fraser, James | ″ 21 | Halifax | ″ ″ 34 ″ 238 | 179 50 | |
| | McKenna, A | ″ 21 | Picton | ″ ″ 34 ″ 238 | 247 36 | |
| | Fair, T. J | ″ 21 | Brantford | ″ ″ 34 ″ 238 | 156 80 | |
| | Geo. E. Tuckett & Son Co., Ltd., The | ″ 21 | Hamilton | ″ ″ 34 ″ 238 | 38 22 | |
| | Nicholson, D | ″ 21 | Charlottetown | ″ ″ 34 ″ 259 | 1 21 | |
| | Macdonald, Sir W. C | ″ 21 | Montreal | ″ ″ 34 ″ 238 | 21 80 | |
| | Dawson, E. J | ″ 21 | London | ″ ″ 34 ″ 238 | 36 50 | |
| | American Tobacco Co., Ltd., The | ″ 25 | Montreal | ″ ″ 34 ″ 238 | 38 46 | |
| | Tobin, John & Co | ″ 25 | Halifax | ″ ″ 34 ″ 238 | 21 54 | |
| | Milligan, Geo | ″ 25 | Toronto | ″ ″ 34 ″ 238 | 483 50 | |
| | Tobin, John & Co | Aug. 5 | Halifax | ″ ″ 34 ″ 238 | 16 23 | |
| | McKenna, A | ″ 5 | Picton | ″ ″ 34 ″ 238 | 160 16 | |
| | Tuckett Cigar Co., The | ″ 5 | Hamilton | ″ ″ 34 ″ 238 | 203 00 | |
| | Geo. E. Tuckett & Son Co., Ltd., The | ″ 5 | ″ | ″ ″ 34 ″ 238 | 717 01 | |
| | Levett, G | ″ 5 | Stratford | ″ ″ 34 ″ 238 | 10 30 | |
| | Isaacs, A | ″ 5 | St. John | ″ ″ 34 ″ 238 | 33 75 | |
| | American Tobacco Co., Ltd., The | ″ 5 | Montreal | ″ ″ 34 ″ 238 | 120 30 | |
| | Gardner, H. B | ″ 5 | Brantford | ″ ″ 34 ″ 238 | 166 10 | |
| | Grothé, L. O | ″ 12 | Montreal | ″ ″ 34 ″ 238 | 1,358 90 | |
| | Sievert, T. G | ″ 12 | Halifax | ″ ″ 34 ″ 238 | 1 62 | |
| | ″ | ″ 12 | ″ | ″ ″ 34 ″ 238 | 13 31 | |
| | Henry, Jas | ″ 12 | Montreal | ″ ″ 34 ″ 238 | 10 66 | |
| | ″ | ″ 15 | ″ | ″ ″ 34 ″ 259 | 1 75 | |
| | Ein, S | ″ 15 | ″ | ″ ″ 34 ″ 259 | 1 17 | |
| | Fortier, J. M | ″ 15 | ″ | ″ ″ 34 ″ 259 | 15 62 | |
| | American Tobacco Co., Ltd., The | ″ 15 | ″ | ″ ″ 34 ″ 259 | 973 34 | |
| | Houde, B. & Co | ″ 15 | Quebec | ″ ″ 34 ″ 259 | 84 68 | |
| | Isaacs, A | ″ 15 | St. John | ″ ″ 34 ″ 259 | 20 33 | |
| | McKenna, A | ″ 15 | Picton | ″ ″ 34 ″ 238 | 132 16 | |
| | Finn, Louis | ″ 22 | Montreal | ″ ″ 34 ″ 259 | 0 92 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Geo. E. Tuckett & Son Co., Ltd., The | " | 23 | Hamilton | " | " | 34 " 259 | 149 42 |
| Bryan, G. F. | " | 23 | Winnipeg | " | " | 34 " 238 | 367 00 |
| Schlueter, W. J. | " | 23 | Guelph | " | " | 34 " 238 | 79 20 |
| Fortier, J. M. | " | 29 | Montreal | " | " | 34 " 238 | 130 84 |
| American Tobacco Co., Ltd., The | Sept. | 4 | " | " | " | 34 " 238 | 1,377 10 |
| Fortier, J. M. | " | 6 | " | " | " | 34 " 238 | 30 00 |
| American Tobacco Co., Ltd., The | " | 6 | " | " | " | 34 " 238 | 68 30 |
| Henry, Jas. | " | 17 | " | " | " | 34 " 259 | 2 47 |
| Finn, Louis | " | 17 | " | " | " | 34 " 259 | 4 05 |
| American Tobacco Co., Ltd., The | " | 17 | " | " | " | 34 " 259 | 1,022 92 |
| Fortier, J. M. | " | 17 | " | " | " | 34 " 259 | 15 94 |
| Ein, S. | " | 17 | " | " | " | 34 " 259 | 1 05 |
| Houde, B. & Co. | " | 17 | Quebec | " | " | 34 " 259 | 90 58 |
| Isaacs, A. | " | 17 | St. John | " | " | 34 " 259 | 34 37 |
| Geo. E. Tuckett & Son Co., Ltd., The | " | 17 | Hamilton | " | " | 34 " 259 | 142 47 |
| American Tobacco Co., Ltd., The | " | 18 | Montreal | " | " | 34 " 259 | 4 71 |
| American Tobacco Co., Ltd., The | " | 18 | " | " | " | 34 " 238 | 171 80 |
| Green, Fischel & Co | " | 18 | " | " | " | 34 " 238 | 17 65 |
| Tobin, John & Co. | " | 18 | Halifax | " | " | 34 " 238 | 71 80 |
| Bauld, Bros. & Co. | " | 18 | " | 3 | " | 34 " 238 | 47 52 |
| Hobrecker, A. | " | 18 | " | " | " | 34 " 238 | 163 90 |
| " | " | 18 | " | " | " | 34 " 238 | 129 11 |
| Kressler, J. H. | " | 18 | Guelph | " | " | 34 " 238 | 19 40 |
| Fortier, J. M. | " | 20 | Montreal | " | " | 34 " 270 | 22 46 |
| McKenna, A. | " | 20 | Picton | " | " | 34 " 238 | 195 11 |
| Tobin & Co., John | " | 25 | Halifax | " | " | 34 " 238 | 17 95 |
| Blumenstiel, I. | " | 27 | Hamilton | " | " | 34 " 238 | 85 30 |
| Cauley, B. | Oct. | 4 | " | " | " | 34 " 238 | 42 90 |
| American Tobacco Co., Ltd., The | " | 4 | Montreal | " | " | 34 " 238 | 43 70 |
| Davis & Sons, S. | " | 11 | " | " | " | 34 " 238 | 8 90 |
| Tuckett Cigar Co., Ltd., The | " | 11 | Hamilton | " | " | 34 " 238 | 316 60 |
| Henry, James | " | 15 | Montreal | " | " | 34 " 259 | 1 94 |
| Ein, S. | " | 15 | " | " | " | 34 " 259 | 0 78 |
| Finn, Louis | " | 15 | " | " | " | 34 " 259 | 6 03 |
| Fortier, J. M. | " | 15 | " | " | " | 34 " 259 | 11 58 |
| American Tobacco Co., Ltd., The | " | 15 | " | " | " | 34 " 259 | 855 19 |
| Houde, B. & Co., | " | 15 | Quebec | " | " | 34 " 259 | 82 38 |
| Isaacs, A. | " | 15 | St. John | " | " | 34 " 259 | 38 45 |
| Geo. E. Tuckett & Son Co., Ltd., The | " | 15 | Hamilton | " | " | 34 " 259 | 137 31 |

## No. 16.—REFUNDS of Revenue—*Continued.*

### EXCISE—*Continued.*

| Articles. | To whom paid. | Date. | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|
| | | 1902. | | | $ cts. | $ cts. |
| Tobacco—*Con.* | Geo. E. Tuckett & Son Co., Ltd., The | Oct. 15 | Hamilton | Refunded under Revised Statutes, cap. 34, sec. 238 | 2 50 | |
| | Henry, James | " 15 | Montreal | " " 34 " 238 | 10 00 | |
| | Gorham, J. W. | " 15 | Halifax | " " 34 " 238 | 21 51 | |
| | Geo. E. Tuckett & Son Co., Ltd., The | " 15 | Hamilton | " " 34 " 238 | 688 42 | |
| | Ward, W | " 18 | London | " " 34 " 238 | 3 80 | |
| | Henry, Jas | " 18 | Montreal | " " 34 " 238 | 63 80 | |
| | Daly, J. M | " 18 | London | " " 34 " 238 | 7 70 | |
| | Milligan, Geo | " 18 | Toronto | " " 34 " 238 | 433 40 | |
| | Atkins, W. | " 20 | London | " " 34 " 238 | 53 80 | |
| | Dawson, E. J | " 20 | " | " " 34 " 238 | 127 60 | |
| | McNee, John | " 20 | " | " " 34 " 238 | 711 40 | |
| | Payne, J. B. | " 20 | Sherbrooke | " " 34 " 238 | 143 50 | |
| | Begy, L. A | " 20 | St. Catharines | " " 34 " 238 | 25 90 | |
| | Tansey, C. E | " 20 | " | " " 34 " 238 | 38 90 | |
| | Nolan, J. F. | " 21 | London | " " 34 " 238 | 212 80 | |
| | Donnelly, James | " 21 | London | " " 34 " 238 | 33 20 | |
| | Kelly, Geo | " 21 | " | " " 34 " 238 | 197 40 | |
| | Simon, H. | " 21 | " | " " 34 " 238 | 209 00 | |
| | Smith, Jos | " 21 | " | " " 34 " 238 | 405 40 | |
| | McDonald, R. D | " 21 | " | " " 34 " 238 | 747 20 | |
| | Ward, D | " 25 | " | " " 34 " 238 | 163 10 | |
| | Winterhalt, Jos | " 25 | Guelph | " " 34 " 238 | 62 70 | |
| | Manness, S. R. | " 25 | London | " " 34 " 238 | 110 40 | |
| | Bollard, A | " 27 | Toronto | " " 34 " 238 | 220 74 | |
| | Bauld, Bros. & Co. | " 29 | Halifax | " " 34 " 238 | 41 36 | |
| | Brener, A. H. | " 29 | London | " " 34 " 238 | 218 80 | |
| | Douglass, H. M | " 29 | " | " " 34 " 238 | 220 80 | |
| | Harkness, Thos. | " 29 | Montreal | " " 34 " 238 | 241 50 | |
| | American Tobacco Co., Ltd., The | " 31 | " | " " 34 " 238 | 31 80 | |
| | Isaacs, A | " 31 | St. John | " " 34 " 238 | 56 68 | |
| | Nelson, C. H | " 31 | Montreal | " " 34 " 238 | 334 60 | |
| | Fortier, J. M | " 31 | " | " " 34 " 238 | 2,029 70 | |
| | Grothé, L. O | " 31 | " | " " 34 " 238 | 1,136 20 | |
| | Gorham & Co., J. W. | Nov. 3 | Halifax | " " 34 " 238 | 7 48 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Tobin, John & Co. | " | 10 | " | " | " | 34 | " | 238 | 14 73 |
| American Tobacco Co., Ltd., The | " | 10 | Montreal | " | " | 34 | " | 238 | 462 30 |
| Jacobs, H. & Co | " | 10 | " | " | " | 34 | " | 238 | 529 50 |
| Skelly, W. H | " | 10 | Guelph | " | " | 34 | " | 238 | 18 20 |
| Lee, Thomas | " | 13 | Winnipeg | " | " | 34 | " | 238 | 189 10 |
| Tietzen, W | " | 13 | Vancouver | " | " | 34 | " | 238 | 141 70 |
| Atkins, W | " | 14 | London | " | " | 34 | " | 238 | 4 60 |
| American Tobacco Co., Ltd., The | " | 14 | Montreal | " | " | 34 | " | 238 | 16 70 |
| Henry, James | " | 15 | " | " | " | 34 | " | 259 | 2 13 |
| Finn, Louis | " | 15 | " | " | " | 34 | " | 259 | 5 17 |
| American Tobacco Co., Ltd., The | " | 15 | " | " | " | 34 | " | 259 | 892 27 |
| Fortier, J. M. | " | 15 | " | " | " | 34 | " | 259 | 13 84 |
| Ein, S | " | 15 | " | " | " | 34 | " | 259 | 0 82 |
| de Cazen, C | " | 15 | " | " | " | 34 | " | 259 | 0 14 |
| Houde, B. & Co | " | 15 | Quebec | " | " | 34 | " | 259 | 90 51 |
| Isaacs, A | " | 15 | St. John | " | " | 34 | " | 259 | 26 23 |
| McKenna, A | " | 17 | Pictou | " | " | 34 | " | 238 | 465 44 |
| " | " | 17 | " | " | " | 34 | " | 238 | 7 59 |
| " | " | 17 | " | " | " | 34 | " | 238 | 176 08 |
| " | " | 17 | " | " | " | 34 | " | 238 | 76 32 |
| " | " | 17 | " | " | " | 34 | " | 238 | 12 65 |
| Bauld, Bros. & Co | " | 18 | Halifax | " | " | 34 | " | 238 | 7 48 |
| " | " | 19 | " | " | " | 34 | " | 238 | 35 64 |
| Hobrecker, A | " | 19 | " | " | " | 34 | " | 238 | 267 34 |
| Whaley, H. R | " | 19 | Windsor | " | " | 34 | " | 238 | 38 20 |
| Ward, W | " | 20 | London | " | " | 34 | " | 238 | 48 50 |
| G. E. Tuckett & Son Co., Ltd., The | " | 21 | Hamilton | " | " | 34 | " | 259 | 108 84 |
| Macdonald, Sir W. C | " | 22 | Montreal | " | " | 34 | " | 238 | 153 48 |
| Tobin, John & Co | " | 25 | Halifax | " | " | 34 | " | 238 | 8 90 |
| Hobrecker, A | " | 26 | " | " | " | 34 | " | 238 | 97 50 |
| American Tobacco Co., Ltd., The | Dec. | 3 | Montreal | " | " | 34 | " | 238 | 8 06 |
| Hobrecker, A | " | 3 | Halifax | " | " | 34 | " | 238 | 21 60 |
| McKenna, A | " | 3 | Pictou | " | " | 34 | " | 238 | 401 36 |
| Youngheart, Ed | " | 3 | Montreal | " | " | 34 | " | 238 | 512 30 |
| Poulin, P | " | 3 | Prescott | " | " | 34 | " | 238 | 93 80 |
| Macdonald, Sir W. C | " | 6 | Montreal | " | " | 34 | " | 238 | 109 20 |
| McKenna, A | " | 6 | Pictou | " | " | 34 | " | 238 | 56 00 |
| Wilson, Andrew | " | 10 | Toronto | " | " | 34 | " | 238 | 116 30 |
| Tuckett Cigar Co., The | " | 10 | Hamilton | " | " | 34 | " | 238 | 329 50 |
| G. E. Tuckett & Son Co., Ltd., The | " | 10 | " | " | " | 34 | " | 238 | 681 03 |
| American Tobacco Co., Ltd., The | " | 19 | Montreal | " | " | 34 | " | 238 | 408 70 |
| Hirsch, Jacob | " | 19 | " | " | " | 34 | " | 238 | 283 40 |
| Solomon, E | " | 19 | " | " | " | 34 | " | 259 | 1 05 |

## No. 16.—Refunds of Revenue—*Continued.*

### EXCISE—*Continued.*

| Articles. | To whom paid. | Date. | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|
| | | 1902. | | | $ cts. | $ cts. |
| Tobacco—*Con*. | Henry, Jas. | Dec. 19 | Montreal | Refunded under Revised Statutes, cap. 34, sec. 259 | 1 22 | |
| | de Cazen, C. | " 19 | " | " " 34 " 259 | 0 74 | |
| | Ein, S | " 19 | " | " " 34 " 259 | 1 05 | |
| | Finn, Louis | " 19 | " | " " 34 " 259 | 4 80 | |
| | Fortier, J. M. | " 19 | " | " " 34 " 259 | 16 81 | |
| | American Tobacco Co., Ltd., The | " 19 | " | " " 34 " 259 | 861 79 | |
| | Houde, B. & Co. | " 19 | Quebec | " " 34 " 259 | 60 46 | |
| | Isaacs, A. | " 19 | St. John | " " 34 " 259 | 43 27 | |
| | G. E. Tuckett & Son Co., Ltd., The | " 19 | Hamilton | " " 34 " 259 | 140 12 | |
| | Dyer, J. J. | " 22 | London | " " 34 " 238 | 262 60 | |
| | Wilson, Andrew | " 24 | Toronto | " " 34 " 238 | 238 70 | |
| | Ward, W. | " 24 | London | " " 34 " 238 | 27 50 | |
| | Henry, James | " 24 | Montreal | " " 34 " 238 | 92 30 | |
| | Shrader, J. H. | " 26 | Hamilton | " " 34 " 238 | 70 90 | |
| | Blumensteil, I. | " 26 | " | " " 34 " 238 | 111 50 | |
| | Fortier, J. M. | " 30 | Montreal | " " 34 " 270 | 3 82 | |
| | | 1903. | | | | |
| | Miller & Lockwell | Jan. 3 | Quebec | " " 34 " 238 | 58 50 | |
| | McKenna, A. | " 3 | Picton | " " 34 " 238 | 132 56 | |
| | Oberndorffer, S. | " 3 | Kingston | " " 34 " 238 | 260 50 | |
| | Donoghue & Bradley | " 3 | Hamilton | " " 34 " 238 | 117 40 | |
| | Fair, Thomas J. | " 3 | Brantford | " " 34 " 238 | 282 30 | |
| | Milligan, Geo | " 3 | Toronto | " " 34 " 238 | 474 30 | |
| | American Tobacco Co., Ltd., The | " 8 | Montreal | " " 34 " 270 | 175 07 | |
| | Hill, John | " 8 | Hamilton | " " 34 " 238 | 24 20 | |
| | Tobin, John & Co. | " 14 | Halifax | " " 34 " 238 | 10 77 | |
| | American Tobacco Co. Ltd., The | " 14 | " | " " 34 " 238 | 144 20 | |
| | G. E. Tuckett & Son Co., Ltd., The | " 14 | Hamilton | " " 34 " 238 | 743 64 | |
| | Lemesurier, John | " 17 | Quebec | " " 34 " 259 | 25 06 | |
| | Henry, James | " 17 | Montreal | " " 34 " 259 | 1 45 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| de Cazen Co. | " | 17 | " | " | " | 34 | " | 259 | 0 68 |
| Ein, S. | " | 17 | " | " | " | 34 | " | 259 | 0 88 |
| Solomon, E. | " | 17 | " | " | " | 34 | " | 259 | 2 40 |
| Fortier, J. M | " | 17 | " | " | " | 34 | " | 259 | 11 43 |
| Finn, Louis | " | 17 | " | " | " | 34 | " | 259 | 3 63 |
| American Tobacco Co., Ltd., The | " | 17 | " | " | " | 34 | " | 259 | 693 23 |
| Isaacs, A | " | 17 | St. John | " | " | 34 | " | 259 | 16 88 |
| G. E. Tuckett & Son Co., Ltd., The | " | 17 | Hamilton | " | " | 34 | " | 259 | 78 54 |
| " " | " | 17 | " | " | " | 34 | " | 238 | 2 10 |
| " " | " | 17 | " | " | " | 34 | " | 238 | 771 73 |
| Bollard, Arthur | " | 17 | Toronto | " | " | 34 | " | 238 | 155 41 |
| Houde, B. & Co. | " | 17 | Quebec | " | " | 34 | " | 259 | 71 53 |
| Creed, J. N. & Co. | " | 17 | Halifax | " | " | 34 | " | 238 | 42 65 |
| Billman, Chisholm & Co | " | 23 | " | " | " | 34 | " | 238 | 86 51 |
| Tobin, John & Co. | " | 27 | " | " | " | 34 | " | 238 | 10 77 |
| Fortier, J. M. | " | 27 | Montreal | " | " | 34 | " | 238 | 111 25 |
| " | " | 27 | " | " | " | 34 | " | 238 | 1,119 30 |
| Houde, B. & Co | " | 31 | Quebec | " | " | 34 | " | 238 | 88 73 |
| Hobrecker, A. | " | 31 | Halifax | " | " | 34 | " | 238 | 501 21 |
| Henry, James. | " | 31 | Montreal | " | " | 34 | " | 238 | 452 50 |
| Granda, F. | Feb. | 5 | " | " | " | 34 | " | 238 | 10 70 |
| G. E. Tuckett & Son Co., Ltd., The | " | 5 | Hamilton | " | " | 34 | " | 238 | 140 40 |
| Macdonald, Sir W. C | " | 5 | Montreal | " | " | 34 | " | 238 | 101 00 |
| Nolan, F | " | 5 | London | " | " | 34 | " | 238 | 24 80 |
| Ward, W | " | 5 | " | " | " | 34 | " | 238 | 24 50 |
| Fortier, J. M | " | 6 | Montreal | " | " | 34 | " | 270 | 5 82 |
| Hobrecker, A | " | 6 | Halifax | " | " | 34 | " | 238 | 63 00 |
| Hynes, Jos | " | 6 | Hamilton | " | " | 34 | " | 238 | 29 40 |
| Timmons, J. F | " | 6 | St. Catharines | " | " | 34 | " | 238 | 17 30 |
| Weis, Frank | " | 6 | " | " | " | 34 | " | 238 | 44 60 |
| Kimberley, G. F. | " | 6 | " | " | " | 34 | " | 238 | 65 20 |
| McHugh, John | " | 6 | " | " | " | 34 | " | 238 | 75 50 |
| Nolan, J. F. | " | 10 | London | " | " | 34 | " | 238 | 149 50 |
| Smith, Jos | " | 10 | " | " | " | 34 | " | 238 | 161 40 |
| Kelly, Jos | " | 10 | " | " | " | 34 | " | 238 | 81 10 |
| Simon, H | " | 10 | " | " | " | 34 | " | 238 | 94 40 |
| McNee, John | " | 10 | " | " | " | 34 | " | 238 | 261 40 |
| Davis, S. & Sons | " | 10 | Montreal | " | " | 34 | " | 238 | 237 50 |
| American Tobacco Co., Ltd., The | " | 10 | " | " | " | 34 | " | 270 | 496 00 |
| Seivert, J. G. | " | 10 | Halifax | " | " | 34 | " | 238 | 15 00 |
| Tuckett Cigar Co, Ltd., The | " | 13 | Hamilton | " | " | 34 | " | 238 | 302 70 |
| McDonald, R. D. | " | 13 | London | " | " | 34 | " | 238 | 479 30 |
| Brener, A. H | " | 17 | " | " | " | 34 | " | 238 | 142 00 |
| Henry, James | " | 17 | Montreal | " | " | 34 | " | 259 | 2 52 |
| Ein, S. | " | 17 | " | " | " | 34 | " | 259 | 0 82 |
| de Cazen, C. | " | 17 | " | " | " | 34 | " | 259 | 0 90 |

## No. 16.—Refunds of Revenue—*Continued.*

### EXCISE—*Continued.*

| Articles. | To whom paid. | Date. | | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|---|
| | | 1903. | | | | $ cts. | $ cts. |
| Tobacco *Con.* | Finn, Louis | Feb. | 17 | Montreal | Refunded under Revised Statutes, cap. 34, sec. 259 | 1 26 | |
| | Solomon, E. | " | 17 | " | " " 34 " 259 | 2 86 | |
| | Fortier, J. M | " | 17 | " | " " 34 " 259 | 6 93 | |
| | American Tobacco Co., Ltd., The | " | 17 | " | " " 34 " 259 | 786 75 | |
| | Isaacs, A | " | 17 | St. John | " " 34 " 259 | 28 61 | |
| | G. E. Tuckett & Son Co., Ltd., The | " | 17 | Hamilton | " " 34 " 259 | 108 80 | |
| | Hobrecker, A | " | 20 | Halifax | " " 34 " 238 | 10 68 | |
| | Seivert, J. G | " | 20 | " | " " 34 " 238 | 88 32 | |
| | Bollard, Arthur | " | 20 | Toronto | " " 34 " 238 | 130 00 | |
| | Tobin, John & Co | " | 23 | St. John | " " 34 " 238 | 10 77 | |
| | McKenna, A | " | 24 | Picton | " " 34 " 238 | 163 12 | |
| | Levett, G | " | 24 | Stratford | " " 34 " 238 | 161 00 | |
| | Hobrecker, A | " | 27 | Halifax | " " 34 " 238 | 5 28 | |
| | Isaacs, A | " | 27 | St. John | " " 34 " 238 | 35 52 | |
| | Tuckett Cigar Co., The | " | 27 | Hamilton | " " 34 " 238 | 251 40 | |
| | American Tobacco Co., Ltd., The | Mar. | 2 | Montreal | " " 34 " 238 | 884 40 | |
| | Tobin, John & Co | " | 7 | Halifax | " " 34 " 238 | 7 40 | |
| | Nolan, J. F. | " | 7 | London | " " 34 " 238 | 16 60 | |
| | Ward, W | " | 7 | " | " " 34 " 238 | 23 30 | |
| | American Tobacco Co., Ltd., The | " | 7 | Montreal | " " 34 " 238 | 196 48 | |
| | McGowan, G. A | " | 7 | Kingston | " " 34 " 238 | 526 80 | |
| | G. E. Tuckett & Son Co., Ltd., The | " | 11 | Hamilton | " " 34 " 259 | 146 66 | |
| | Milligan, G | " | 14 | Toronto | " " 34 " 238 | 368 10 | |
| | de Cazen, C | " | 16 | Montreal | " " 34 " 259 | 0 60 | |
| | Henry, James | " | 16 | " | " " 34 " 259 | 4 32 | |
| | Ein, S | " | 16 | " | " " 34 " 259 | 0 79 | |
| | Finn, Louis | " | 16 | " | " " 34 " 259 | 1 09 | |
| | Solomon, E | " | 16 | " | " " 34 " 259 | 2 15 | |
| | Fortier, J. M | " | 16 | " | " " 34 " 259 | 17 61 | |
| | American Tobacco Co., Ltd., The | " | 16 | " | " " 34 " 259 | 843 74 | |
| | Isaacs, A | " | 16 | St. John | " " 34 " 259 | 31 47 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Houde, B. & Co. | " | 16 | Quebec | " | " | 34 | " | 259 | 118 05 |
| Lemesurier, John | " | 16 | Quebec | " | " | 34 | " | 259 | 6 42 |
| Lavoie, J. M | " | 16 | Ottawa | " | " | 34 | " | 238 | 17 95 |
| G. E. Tuckett & Son Co., Ltd., The | " | 20 | Hamilton | " | " | 34 | " | 238 | 722 05 |
| Tobin, John & Co | " | 20 | Halifax | " | " | 34 | " | 238 | 12 32 |
| Davis, S. & Sons | " | 20 | Montreal | " | " | 34 | " | 238 | 713 90 |
| Brown, H. A | " | 26 | Vancouver | " | " | 34 | " | 238 | 54 10 |
| Henry, J | " | 27 | Montreal | " | " | 34 | " | 238 | 6 00 |
| Fortier, J. M | " | 30 | " | " | " | 34 | " | 238 | 1,601 20 |
| McKenna, A | " | 30 | Pictou | " | " | 34 | " | 238 | 379 07 |
| Creed, J. N. & Co | Apr. | 2 | Halifax | " | " | 34 | " | 238 | 15 37 |
| Tobin, John & Co | " | 2 | " | " | " | 34 | " | 238 | 10 77 |
| Simon, Leiser & Co | " | 2 | Victoria | " | " | 34 | " | 238 | 721 40 |
| Macdonald, Sir W.C. | " | 4 | Montreal | " | " | 34 | " | 238 | 93 50 |
| McKenna, A | " | 9 | Pictou | " | " | 34 | " | 238 | 291 92 |
| Henry, James | " | 20 | Montreal | " | " | 34 | " | 259 | 5 08 |
| de Cazen, C | " | 20 | " | " | " | 34 | " | 259 | 0 90 |
| Ein, S | " | 20 | " | " | " | 34 | " | 259 | 1 00 |
| Finn, Louis | " | 20 | " | " | " | 34 | " | 259 | 1 58 |
| Solomon, E | " | 20 | " | " | " | 34 | " | 259 | 2 59 |
| Fortier, J. M | " | 20 | " | " | " | 34 | " | 259 | 25 67 |
| American Tobacco Co., Ltd., The | " | 20 | " | " | " | 34 | " | 259 | 962 20 |
| Isaacs, A | " | 20 | St. John | " | " | 34 | " | 259 | 28 21 |
| G. E. Tuckett & Son Co., Ltd., The | " | 20 | Hamilton | " | " | 34 | " | 259 | 152 97 |
| " " | " | 20 | " | " | " | 34 | " | 238 | 3 00 |
| McKenna, A | " | 21 | Pictou | " | " | 34 | " | 238 | 12 00 |
| American Tobacco Co., Ltd., The | " | 21 | Montreal | " | " | 34 | " | 238 | 252 00 |
| Creed, J. N. & Co | " | 21 | Halifax | " | " | 34 | " | 238 | 143 50 |
| Tuckett Cigar Co., The | " | 21 | Hamilton | " | " | 34 | " | 238 | 262 80 |
| Blumenstiel, I | " | 21 | " | " | " | 34 | " | 238 | 133 40 |
| Payne, J. B | " | 22 | Sherbrooke | " | " | 34 | " | 238 | 40 40 |
| Hudson's Bay Co | " | 22 | Victoria | " | " | 34 | " | 238 | 149 92 |
| Fair, T. J. & Co., Ltd | " | 23 | Brantford | " | " | 34 | " | 238 | 177 20 |
| Wilson, Andrew | " | 23 | Toronto | " | " | 34 | " | 238 | 227 30 |
| Hobrecker, A | " | 23 | Halifax | " | " | 34 | " | 238 | 61 37 |
| " | " | 23 | " | " | " | 34 | " | 238 | 356 15 |
| Tobin, J. & Co | " | 25 | " | " | " | 34 | " | 238 | 10 77 |
| Thelin, J. C | " | 25 | Vancouver | " | " | 34 | " | 238 | 23 00 |
| Dooley, James | " | 27 | London | " | " | 34 | " | 238 | 189 80 |
| Creed, J. N. & Co | " | 27 | Halifax | " | " | 34 | " | 238 | 20 32 |
| McKenna, A | " | 27 | " | " | " | 34 | " | 238 | 297 28 |
| Milligan, Geo | May | 1 | Toronto | " | " | 34 | " | 238 | 377 10 |
| McKenna, A | " | 7 | Pictou | " | " | 34 | " | 238 | 20 88 |
| Bauld Bros. & Co | " | 7 | Halifax | " | " | 34 | " | 238 | 13 76 |
| Halloran, M. K | " | 7 | Brantford | " | " | 34 | " | 238 | 62 40 |
| Dyer, J. J | " | 7 | London | " | " | 34 | " | 238 | 271 50 |

## No. 16.—Refunds of Revenue—*Continued.*

### EXCISE—*Continued.*

| Articles. | To whom paid. | Date. | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|
| | | 1903. | | | $ cts. | $ cts. |
| Tobacco—*Con.* | Hobrecker, A. | May 13 | Halifax | Refunded under Revised Statutes, cap. 34, sec. 238 | 16 12 | |
| | Creed, J. N. & Co. | " 13 | " | " " 34 " 238 | 149 90 | |
| | Tobin, J. & Co. | . 14 | St. John | " " 34 " 238 | 35 90 | |
| | Jacobs & Co., J. | " 14 | Montreal | " " 34 " 238 | 502 10 | |
| | Nolan, J. F. | " 14 | London | " " 34 " 238 | 96 30 | |
| | Creed, J. N. & Co. | " 19 | Halifax | " " 34 " 238 | 24 68 | |
| | Seaton & Co | " 19 | " | " " 34 " 238 | 12 04 | |
| | Ateshian, Carnig | " 19 | Montreal | " " 34 " 270 | 10 00 | |
| | Fortier, J. M. | " 19 | " | " " 34 " 270 | 2 93 | |
| | Henry, Jas | " 19 | " | " " 34 " 259 | 6 36 | |
| | de Cazen, C. | " 19 | " | " " 34 " 259 | 1 02 | |
| | Ein, S. | " 19 | " | " " 34 " 259 | 1 08 | |
| | Finn, Louis | " 19 | . | " " 34 " 259 | 1 85 | |
| | Solomon, E. | " 19 | " | " " 34 " 259 | 3 77 | |
| | Fortier, J. M. | " 19 | " | " " 34 " 259 | 24 52 | |
| | American Tobacco Co., Ltd., The | " 19 | " | " " 34 " 259 | 863 54 | |
| | Houde, B. & Co. | " 19 | Quebec | " " 34 " 259 | 41 39 | |
| | Isaacs, A. | " 19 | St. John | " " 34 " 259 | 18 82 | |
| | G. E. Tuckett & Son Co., Ltd., The | " 19 | Hamilton | " " 34 " 259 | 134 97 | |
| | McNee, John | " 19 | London | " " 34 " 238 | 242 20 | |
| | Smith, Jos | " 19 | " | " " 34 " 238 | 163 00 | |
| | McDonaid, R. D. | " 19 | " | " " 34 " 238 | 682 80 | |
| | Brener, A. H. | " 19 | " | " " 34 " 238 | 209 70 | |
| | Lee, Thomas | " 19 | Winnipeg | " " 34 " 238 | 191 60 | |
| | Kelly, Geo. | " 20 | London | " " 34 " 238 | 78 20 | |
| | McKenna, A. | June 2 | Pictou | " " 34 " 238 | 920 40 | |
| | Bauld Bros. & Co | " 2 | Halifax | " " 34 " 238 | 31 04 | |
| | Creed, J. N. & Co. | " 2 | " | " " 34 " 238 | 161 12 | |
| | American Tobacco Co., Ltd., The | " 2 | Montreal | " " 34 " 270 | 226 55 | |
| | " " | " 5 | " | " " 34 " 238 | 273 90 | |
| | Ateshian, Carnig | " 5 | " | " " 34 " 259 | 1 00 | |
| | Webster, W. R. | " 5 | Sherbrooke | " " 34 " 238 | 725 80 | |
| | Tietjen, W. | " 5 | Vancouver | " " 34 " 238 | 207 30 | |
| | Province Cigar Co., The | " 5 | Victoria | " " 34 " 238 | 280 40 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Wilson, Andrew | " | 8 | Toronto | " | " | 34 | " | 238 | 214 20 |
| G. E. Tuckett & Son Co., Ltd., The | " | 8 | Hamilton | " | " | 34 | " | 238 | 9 75 |
| Fortier, J. M | " | 8 | Montreal | " | " | 34 | " | 270 | 2 00 |
| Tuckett Cigar Co., The | " | 10 | Hamilton | " | " | 34 | " | 238 | 379 40 |
| Douglas, H. M | " | 11 | London | " | " | 34 | " | 238 | 243 60 |
| Seivert, J. G | " | 11 | Halifax | " | " | 34 | " | 238 | 120 52 |
| " | " | 11 | " | " | " | 34 | " | 238 | 7 87 |
| Bollard, Arthur | " | 11 | Toronto | " | " | 34 | " | 270 | 250 38 |
| Ateshian, C | " | 12 | Montreal | " | " | 34 | " | 270 | 8 00 |
| Henry, Jas | " | 15 | Montreal | " | " | 34 | " | 238 | 3 87 |
| Ein, S | " | 15 | " | " | " | 34 | " | 259 | 0 84 |
| de Cazen, C. | " | 15 | " | " | " | 34 | " | 259 | 1 09 |
| Solomon, E | " | 15 | " | " | " | 34 | " | 259 | 3 82 |
| Fortier, J. M. | " | 15 | " | " | " | 34 | " | 259 | 19 91 |
| American Tobacco Co., Ltd., The | " | 15 | " | " | " | 34 | " | 259 | 756 69 |
| Isaacs, A | " | 15 | St. John | " | " | 34 | " | 259 | 40 40 |
| G. E. Tuckett & Son Co., Ltd., The | " | 15 | Hamilton | " | " | 34 | " | 259 | 161 85 |
| Henry, Jas | " | 15 | Montreal | " | " | 34 | " | 270 | 10 00 |
| Rithet, R. P. & Co | " | 17 | Victoria | " | " | 34 | " | 238 | 82 93 |
| G. E. Tuckett & Son Co., Ltd., The | " | 17 | Hamilton | " | " | 34 | " | 238 | 34 32 |
| Winter, E. J | " | 17 | Brantford | " | " | 34 | " | 238 | 38 40 |
| Isaacs, A | " | 17 | St. John | " | " | 34 | " | 238 | 281 60 |
| Fortier, J. M | " | 17 | Montreal | " | " | 34 | " | 238 | 1,292 50 |
| Winterhalt, Jos | " | 19 | Guelph | " | " | 34 | " | 238 | 110 90 |
| Payne, J. B | " | 19 | Sherbrooke | " | " | 34 | " | 238 | 377 90 |
| McKenna, A | " | 22 | Picton | " | " | 34 | " | 238 | 10 08 |
| G. E. Tuckett & Son Co., Ltd., The | " | 23 | Hamilton | " | " | 34 | " | 238 | 691 60 |
| Lewis, Frank | " | 23 | London | " | " | 34 | " | 238 | 1 40 |
| Taylor, John | " | 24 | Toronto | " | " | 34 | " | 238 | 115 40 |
| Harkness, Thos | " | 30 | Montreal | " | " | 34 | " | 238 | 33 62 |
| Tansey, C. E | " | 30 | St. Catharines | " | " | 34 | " | 238 | 33 70 |
| Daly, J. M | " | 30 | London | " | " | 34 | " | 238 | 122 00 |
| Seaton, R. B. & Co | July | 8 | Halifax | " | " | 34 | " | 238 | 129 00 |
| Fair, T. J | " | 8 | Brantford | " | " | 34 | " | 238 | 205 20 |
| Blumenstiel, I | " | 8 | Hamilton | " | " | 34 | " | 238 | 198 10 |
| Begy, L. A | " | 8 | St. Catharines | " | " | 34 | " | 238 | 21 30 |
| Harkness, Thos | " | 8 | Montreal | " | " | 34 | " | 238 | 173 20 |
| Henry, James | " | 8 | " | " | " | 34 | " | 238 | 398 20 |
| Riley, D. J | " | 8 | Charlottetown | " | " | 34 | " | 238 | 188 10 |
| American Tobacco Co., Ltd., The | " | 8 | Montreal | " | " | 34 | " | 238 | 501 98 |
| Milligan, Geo | " | 9 | Toronto | " | " | 34 | " | 238 | 436 50 |
| Whaley, H. R | " | 9 | Windsor | " | " | 34 | " | 238 | 31 30 |
| Dooley, Jas | " | 10 | London | " | " | 34 | " | 238 | 156 90 |
| Ateshian, Carnig | " | 10 | Montreal | " | " | 34 | " | 238 | 20 00 |

## No. 16.—Refunds of Revenues—*Concluded.*

### EXCISE—*Concluded.*

| Articles. | To whom paid. | Date. | Divisions. | Under what Authority Refunded. | Amounts. | Totals. |
|---|---|---|---|---|---|---|
| | | 1903. | | | $ cts. | $ cts. |
| Tobacco—*Con.* | Creed, J. N. & Co | July 13 | Halifax | Refunded under Revised Statutes, cap. 34, sec. 259 | 33 68 | |
| | Ryall, C. A | " 13 | Windsor | " " 34 " 238 | 62 70 | |
| | Daly, J. M | " 14 | London | " " 34 " 238 | 4 30 | |
| | American Tobacco Co., Ltd., The | " 15 | Montreal | " " 34 " 238 | 149 30 | |
| | McKenna, A | " 15 | Picton | " " 34 " 238 | 147 04 | |
| | Tuckett Cigar Co., The | " 15 | Hamilton | " " 34 " 238 | 114 80 | |
| | Jacobs, H. & Co. | " 15 | Montreal | " " 34 " 238 | 331 00 | |
| | Creed, J. N. & Co | " 20 | Halifax | " " 34 " 238 | 31 12 | |
| | Nicholson, Donald | " 20 | Charlottetown | " " 34 " 259 | 2 44 | |
| | Henry, James | " 20 | Montreal | " " 34 " 259 | 5 49 | |
| | Ein, S | " 20 | " | " " 34 " 259 | 1 24 | |
| | Solomon, C | " 20 | " | " " 34 " 259 | 4 09 | |
| | de Cazen, C | " 20 | " | " " 34 " 259 | 6 50 | |
| | Fortier, J. M | " 20 | " | " " 34 " 259 | 25 65 | |
| | American Tobacco Co., Ltd., The | " 20 | " | " " 34 " 259 | 1,022 99 | |
| | Isaacs, A | " 20 | St. John | " " 34 " 259 | 42 52 | |
| | Creed, J. N. & Co | " 20 | Halifax | " " 34 " 238 | 138 70 | |
| | Bauld Bros. & Co | " 22 | " | " " 34 " 238 | 71 61 | |
| | Ateshian, C | " 22 | Montreal | " " 34 " 259 | 0 78 | |
| | Lemesurier, John | " 22 | Quebec | " " 34 " 259 | 29 05 | |
| | Schrader, J. H | " 22 | Hamilton | " " 34 " 238 | 62 50 | |
| | Cauley, B | " 22 | " | " " 34 " 238 | 56 40 | |
| | Berry, H. D | " 25 | Quebec | " " 34 " 238 | 1,167 60 | |
| | McKenna, A | " 25 | Picton | " " 34 " 238 | 74 72 | |
| | Fortier, J. M | " 25 | Montreal | " " 34 " 238 | 46 43 | |
| | | | | | 71,116 97 | |
| | | 1902. | | Less refund | 12 64 | |
| | | | | | | 71,104 33 |
| Cigars | Fair, T. J | Sept. 6 | Brantford | Refunded under Revised Statutes, cap. 34, sec. 238 | | 0 45 |
| | | 1903. | | | | |
| Manufact'res in Bond | Tellier, J. A | Feb. 17 | St. Hyacinthe | " " 34 " 238 | | 174 53 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1902. | | | | | | |
| Officer's salary | Allen, S. | Sept. 6 | Brantford | " | " | 34 " 238 | | 300 00 |
| Fusel oil | Skinner, H. & Co | " 20 | Kingston | " | " | 34 " 238 | 67 75 | |
| | Blumenstiel, I | " 27 | Hamilton | " | " | 34 " 238 | 1 50 | |
| | | | | | | | | 69 25 |
| Bonded Warehouse License | Clarke, A. J | | St. John | " | " | 34 " 238 | | 10 00 |
| Hydraulic rents | Laurentides Pulp Co., Ltd | Oct. 18 | Three Rivers | " | " | 34 " 238 | | 100 00 |
| | | 1903 | | | | | | |
| Methylated spirits warehouse expenditures | Goldie, McCullough & Co., Ltd | March 5 | Guelph | " | " | 34 " 238 | | 16 41 |
| | | 1902. | | | | | | |
| Electric light registration fees | The Corporation of the Town of Thorold | Nov. 14 | St. Catharines | " | " | 34 " 238 | | 15 00 |
| | | | | Grand Total | | | | $246,721 53 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

DR. | CR.

## No. 17.—DEPARTMENTAL EXPENSES.

*(For Details, see Appendix B.)*

| Due by sundry persons, July 1, 1902. | Disbursed by the Receiver General. | Deductions for | | | Totals. | — | Salaries. | Contingencies. | Due by sundry persons, June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Superannuation. | Insurance. | Retirement. | | | | | | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. |
| | 7,000 00 | | | | 7,000 00 | Minister of Inland Revenue | 7,000 00 | | | 7,000 00 |
| | 33,450 55 | 670 55 | 116 40 | 122 50 | 34,360 00 | Departmental Officers | 34,360 00 | | | 34,360 00 |
| | 198 64 | | | | 198 64 | Subscription to Newspapers | | 198 64 | | 198 64 |
| | 1,115 00 | | | | 1,115 00 | Extra Clerks, &c | | 1,115 00 | | 1,115 00 |
| | 196 15 | | | | 196 15 | Telegraph Companies and Telephone | | 196 15 | | 196 15 |
| | 1,685 72 | | | | 1,685 72 | Stationery | | 1,685 72 | | 1,685 72 |
| | 437 90 | | | | 437 90 | Books and Maps | | 437 90 | | 437 90 |
| | 876 38 | | | | 876 38 | Printing and Lithographing | | 876 38 | | 876 38 |
| | 20 09 | | | | 20 09 | Postage | | 20 09 | | 20 09 |
| 16 66 | 259 36 | | | | 276 02 | Sundry persons | | 259 36 | 16 66 | 276 02 |
| 16 66 | 45,239 79 | 670 55 | 116 40 | 122 50 | 46,165 90 | Totals | 41,360 00 | 4,789 24 | 16 66 | 46,165 90 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## WEIGHTS AND MEASURES, GAS, ELECTRIC LIGHT AND LAW STAMPS.

### No. 18.—STATEMENT showing amount of Revenue accrued during Year ended June 30, 1903.

DR.

| — | Weights and Measures Stamps. | Gas Stamps. | Electric Light Stamps. | Law Stamps. | | | | Totals. |
|---|---|---|---|---|---|---|---|---|
| | | | | Supreme Court. | Exchequer Court. | Yukon Territorial Court. | Yukon Mining Court. | |
| | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| To amount of stamps destroyed or returned by distributors | 377 45 | | | | | | | 377 45 |
| To commission allowed | | | | 65 00 | 170 90 | | | 235 90 |
| To amount of stamps remaining in hands of distributors, June 30, 1903 | 50,305 60 | 29,054 05 | 36,248 00 | | | 13,154 00 | 2,643 00 | 131,404 65 |
| To balance, being the revenue during 1902-1903 | 64,175 05 | 25,134 25 | 19,729 75 | 1,235 00 | 3,247 10 | 13,096 00 | 2,557 00 | 129,174 15 |
| Totals | 114,858 10 | 54,188 30 | 55,977 75 | 1,300 00 | 3,418 00 | 26,250 00 | 5,200 00 | 261,192 15 |

CR.

| — | Weights and Measures Stamps. | Gas Stamps. | Electric Light Stamps. | Law Stamps. | | | | Totals. |
|---|---|---|---|---|---|---|---|---|
| | | | | Supreme Court | Exchequer Court. | Yukon Territorial Court. | Yukon Mining Court. | |
| | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| By amount of stamps in the hands of distributors on July 1, 1902 | 44,736 60 | 29,833 30 | 36,440 25 | | | 18,250 00 | | 129,260 15 |
| By stamps issued by Inland Revenue Department during the year | 70,121 50 | 24,355 00 | 19,537 50 | 1,300 00 | 3,418 00 | 8,000 00 | 5,200 00 | 131,932 00 |
| Totals | 114,858 10 | 54,188 30 | 55,977 75 | 1,300 00 | 3,418 00 | 26,250 00 | 5,200 00 | 261,192 15 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## WEIGHTS AND MEASURES, 1902-1903.

Dr. — No. 19 (A).—Inspection Divisions in Account with Revenue. — Cr.

| Balances due by Inspectors, July 1, 1902. | | Stamps issued to Inspectors. | Seizures and Penalties. | Other Receipts. | Totals. | Divisions. | Stamps returned or destroyed. | Deposited to the credit of the Receiver General. | Balances due by Inspectors, June 30, 1903. | | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stamps on hand. | Cash on hand. | | | | | | | | Stamps on hand. | Cash on hand. | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 1,247 30 | ........ | 6,525 00 | 20 00 | ...... | 7,792 30 | Belleville | 34 50 | 4,053 50 | 3,694 30 | ........ | 7,792 30 |
| 4,317 73 | ........ | 9,331 00 | ........ | ........ | 13,648 73 | Hamilton | ........ | 8,813 24 | 4,835 49 | ........ | 13,648 73 |
| 2,160 14 | ........ | 8,673 00 | ........ | 15 00 | 10,848 14 | Ottawa | 312 45 | 8,434 73 | 2,100 96 | ........ | 10,848 14 |
| 4,911 27 | ........ | 4,835 00 | ........ | ........ | 9,746 27 | Toronto | ........ | 6,394 99 | 3,351 28 | ........ | 9,746 27 |
| 3,220 53 | ........ | 8,170 00 | ........ | ........ | 11,390 53 | Windsor | ........ | 7,598 19 | 3,792 34 | ........ | 11,390 53 |
| 15,856 97 | ........ | 37,534 00 | 20 00 | 15 00 | 53,425 97 | *Ontario* | 346 95 | 35,304 65 | 17,774 37 | ........ | 53,425 97 |
| 10,870 33 | ........ | 13,335 00 | ........ | ........ | 24,205 33 | Montreal | ........ | 10,825 85 | 13,379 48 | ........ | 24,205 33 |
| 1,664 44 | 37 15 | 6,120 00 | ........ | ........ | 7,821 59 | Quebec | 15 00 | 4,526 59 | 3,280 00 | ........ | 7,821 59 |
| 3,886 73 | ........ | 400 00 | ........ | ........ | 4,286 73 | St. Hyacinthe | ........ | 1,778 73 | 2,508 00 | ........ | 4,286 73 |
| 3,315 60 | ........ | 2,110 00 | 5 00 | ........ | 5,430 60 | Three Rivers | ........ | 1,474 15 | 3,956 45 | ........ | 5,430 60 |
| 19,737 10 | 37 15 | 21,965 00 | 5 00 | ........ | 41,744 25 | *Quebec* | 15 00 | 18,605 32 | 23,123 93 | ........ | 41,744 25 |
| 1,556 25 | ........ | 1,280 00 | ........ | ........ | 2,836 25 | *St. John, N.B.* | 15 35 | 1,180 79 | 1,640 11 | ........ | 2,836 25 |
| 409 72 | ........ | 330 00 | ........ | ........ | 739 72 | Cape Breton | 0 15 | 544 98 | 194 59 | ........ | 739 72 |
| 613 99 | 50 45 | 1,087 50 | ........ | ........ | 1,751 94 | Halifax | ........ | 933 45 | 818 49 | ........ | 1,751 94 |
| 1,336 88 | ........ | 550 00 | ........ | ........ | 1,886 88 | Picton | ........ | 905 11 | 981 77 | ........ | 1,886 88 |
| 2,360 59 | 50 45 | 1,967 50 | ........ | ........ | 4,378 54 | *Nova Scotia* | 0 15 | 2,383 54 | 1,994 85 | ........ | 4,378 54 |
| 579 28 | ........ | 402 50 | ........ | ........ | 981 78 | *Charlottetown, P.E.I.* | ........ | 471 94 | 509 84 | ........ | 981 78 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3,923 97 | .... | 4,600 00 | .... | .... | 8,523 97 | *Winnipeg, Man.* | .... | 4,778 81 | 3,745 16 | .... | 8,523 97 |
| 258 24 | .... | 1,105 00 | .... | .... | 1,363 24 | *Calgary, N.W.T.* | .... | 684 75 | 678 49 | .... | 1,363 24 |
| 464 20 | .... | 1,267 50 | 25 00 | .... | 1,756 70 | *Victoria, B.C.* | .... | 947 85 | 838 85 | .... | 1,756 70 |
| 44,736 60 | 87 60 | 70,121 50 | 50 00 | 15 00 | 115,010 70 | Grand Totals | 377 45 | 64.327 65 | 50,305 60 | .... | 115,010 70 |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## WEIGHTS AND MEASURES, 1902-1903.

### No. 19 (B).—Deputy Inspectors of the Old Divisions in Account with Revenue.

Dr. Cr.

| Balances due July 1, 1902. — Cash on hand. | Totals. | Divisions. | Balances due June 30, 1903. — Cash on hand. | Totals. |
|---|---|---|---|---|
| $ cts. | $ cts. | | $ cts. | $ cts. |
| 87 10 | 87 10 | Essex | 87 10 | 87 10 |
| 87 10 | 87 10 | *Ontario* | 87 10 | 87 10 |
| 5 62 | 5 62 | Hull | 5 62 | 5 62 |
| 5 62 | 5 62 | *Quebec* | 5 62 | 5 62 |
| 92 72 | 92 72 | Totals | 92 72 | 92 72 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

# WEIGHTS AND MEASURES, 1902-1903.

## No. 20 (A).—INSPECTION DIVISIONS in Account with Expenditures.

*(For Details, see Appendix B.)*

DR. | CR.

| Amounts received from Department to meet Expenditures. | Deductions from Salaries for | | | Totals. | Divisions. | Expenditures Authorized by the Department. | | | | | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Superannuation. | Insurance. | Guarantee | | | Salaries. | Special Assistance | Rent. | Travelling Expenses. | Sundries. | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 5,909 00 | 51 92 | ...... | 10 80 | 5,971 72 | Belleville | 3,449 96 | 499 92 | 314 17 | 1,186 41 | 521 26 | 5,971 72 |
| 7,796 00 | 32 08 | ...... | 16 20 | 7,844 28 | Hamilton | 6,499 84 | ...... | ...... | 1,247 36 | 97 08 | 7,844 28 |
| 5,888 04 | 13 04 | 41 76 | 11 40 | 5,954 24 | Ottawa | 4,165 10 | ...... | 250 00 | 1,333 26 | 205 88 | 5,954 24 |
| 5,948 23 | 16 04 | ...... | 10 80 | 5,975 07 | Toronto | 4,199 72 | ...... | ...... | 1,665 74 | 109 61 | 5,975 07 |
| 5,268 13 | 28 04 | ...... | 9 00 | 5,305 17 | Windsor | 3,749 84 | ...... | ...... | 1,426 91 | 128 42 | 5,305 17 |
| 30,809 40 | 141 12 | 41 76 | 58 20 | 31,050 48 | *Ontario* | 22,064 46 | 499 92 | 564 17 | 6,859 68 | 1,062 25 | 31,050 18 |
| 8,367 74 | 64 04 | ...... | 16 20 | 8,417 98 | Montreal | 6,949 64 | ...... | ...... | 1,200 35 | 297 99 | 8,447 98 |
| 8,069 23 | 77 88 | 38 28 | 15 60 | 8,200 99 | Quebec | 6,191 85 | ...... | ...... | 1,850 91 | 158 23 | 8,200 99 |
| 2,896 10 | ...... | ...... | 7 35 | 2,903 45 | St. Hyacinthe | 2,141 54 | 60 47 | ...... | 636 05 | 65 39 | 2,903 45 |
| 2,504 19 | ...... | ...... | 6 90 | 2,511 09 | Three Rivers | 1,916 48 | ...... | ...... | 580 05 | 14 56 | 2,511 09 |
| 21,837 26 | 141 92 | 38 28 | 46 05 | 22,063 51 | *Quebec* | 17,499 51 | 60 47 | ...... | 4,267 36 | 536 17 | 22,063 51 |
| 3,212 67 | 43 96 | ...... | 8 40 | 3,265 03 | *St. John, N.B.* | 2,906 44 | ...... | ...... | 337,93 | 20 66 | 3,265 03 |
| 1,314 01 | ...... | ...... | 3 60 | 1,317 61 | Cape Breton | 800 00 | ...... | 50 00 | 438 75 | 28 86 | 1,317 61 |
| 3,295 49 | ...... | ...... | 5 40 | 3,300 89 | Halifax | 1,599 96 | 866 58 | 375 00 | 307 80 | 151 55 | 3,300 89 |
| 1,905 73 | 19 96 | ...... | 5 40 | 1,931 09 | Pictou | 1,600 00 | ...... | ...... | 252 00 | 79 09 | 1,931 09 |
| 6,515 23 | 19 96 | ...... | 14 40 | 6,549 59 | *Nova Scotia* | 3,999 96 | 866 58 | 425 00 | 998 55 | 259 50 | 6,549 59 |
| 1,756 63 | ...... | ...... | 5 40 | 1,762 03 | *Charlottetown, P.E.I.* | 1,549 92 | ...... | ...... | 160 75 | 51 36 | 1,762 03 |

## WEIGHTS AND MEASURES, 1902-1903.

### No. 20 (A).—Inspection Divisions in Account with Expenditures—*Concluded.*

(*For Detaili, see Appendix B.*)

| Amounts received from Department to meet Expenditures. | Deductions from Salaries for | | | Totals. | Divisions. | Expenditures Authorized by the Department. | | | | | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Superannuation. | Insurance. | Guarantee | | | Salaries. | Special Assittance | Rent. | Travelling Expenses. | Sundries. | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 5,785 53 | 4 04 | ...... | 10 80 | 5,800 37 | Winnipeg | 2,999 84 | 902 34 | 75 00 | 1,630 56 | 192 63 | 5,800 37 |
| 1,191 55 | 15 00 | ...... | 4 78 | 1,211 33 | Calgary | 915 48 | ...... | ...... | 295 85 | ...... | 1,211 33 |
| 6,977 08 | 19 04 | ...... | 15 58 | 7,011 70 | *Manitoba and N. W. Territories* | 3,915 32 | 902 34 | 75 00 | 1,926 41 | 192 63 | 7,011 70 |
| 3,474 02 | ...... | ...... | 7 20 | 3,481 22 | *Victoria, B.C.* | 1,749 84 | ...... | 180 00 | 1,455 16 | 96 22 | 3,481 22 |
| 2,035 68 | ...... | ...... | ...... | 2,035 68 | Chief Inspector | 1,794 33 | ...... | ...... | 241 35 | ...... | 2,035 68 |
| 8,902 65 | ...... | ...... | ...... | 8,902 65 | General Contingencies | ...... | ...... | ...... | ...... | 8,902 65 | 8,902 65 |
| 1,174 28 | .. | ...... | ...... | 1,174 28 | Printing | ...... | ...... | ...... | ...... | 1,174 28 | 1,174 28 |
| 211 43 | ...... | ...... | ...... | 211 43 | Stationery | ...... | ...... | ...... | ...... | 211 43 | 211 43 |
| 86,906 33 | 366 00 | 80 04 | 155 23 | 87,507 60 | Grand Totals | 55,179 78 | 2,329 31 | 1,244 17 | 16,247 19 | 12,507 15 | 87,507 60 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## WEIGHTS AND MEASURES, 1902-1903.

### DR. No. 20 (B).—INSPECTION DIVISIONS in Account with Expenditures. CR.

| Balances due by sundry persons, July 1, 1902. | Totals. | Divisions. | Balances due by sundry persons June 30, 1903. | Totals. |
|---|---|---|---|---|
| $ cts. | $ cts. | | $ cts. | $ cts. |
| 39 56 | 39 56 | Essex | 39 56 | 39 56 |
| 33 53 | 33 53 | Waterloo | 33 53 | 33 53 |
| 73 09 | 73 09 | *Ontario* | 73 09 | 73 09 |
| 0 33 | 0 33 | Drummond | 0 33 | 0 33 |
| 41 45 | 41 45 | Laval | 41 45 | 41 45 |
| 26 88 | 26 88 | Montmorency | 26 88 | 26 88 |
| 27 51 | 27 51 | Richelieu | 27 51 | 27 51 |
| 96 17 | 96 17 | *Quebec* | 96 17 | 96 17 |
| 24 00 | 24 00 | Lunenburg, Nova Scotia | 24 00 | 24 00 |
| 193 26 | 193 26 | Totals | 193 26 | 193 26 |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## No. 21.—GAS INSPECTION, 1902-3.

DR. INSPECTION DISTRICTS in Account with Revenue. CR.

| Balances due by Inspectors, July, 1, 1902. | | Stamps issued to Inspectors. | Penalties. | Other Receipts. | Totals. | Districts. | Deposited to the credit of the Receiver General. | Balances due by Inspectors, June 30, 1903. | | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|
| Stamps on hand. | Cash on hand. | | | | | | | Stamps on hand. | Cash on hand. | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. |
| 601 50 | .... | 275 00 | .... | .... | 876 50 | Barrie | 125 00 | 751 50 | .... | 876 50 |
| 827 50 | .... | .... | .... | .... | 827 50 | Belleville | 87 75 | 739 75 | .... | 827 50 |
| 750 50 | .... | 100 00 | .... | .... | 850 50 | Berlin | 302 00 | 548 50 | .... | 850 50 |
| 352 00 | .... | 200 00 | .... | .... | 552 00 | Brockville | 206 75 | 345 25 | .... | 552 00 |
| 485 50 | .... | .... | 15 00 | .... | 500 50 | Cobourg | 191 50 | 309 00 | .... | 500 50 |
| 254 00 | .... | .... | .... | .... | 254 00 | Cornwall | 63 25 | 190 75 | .... | 254 00 |
| 426 25 | .... | 175 00 | .... | .... | 601 25 | Guelph | 175 00 | 426 25 | .... | 601 25 |
| 1,614 50 | .... | 2,625 00 | .... | .... | 4,239 50 | Hamilton | 2,322 50 | 1,917 00 | .... | 4,239 50 |
| 729 50 | .... | 250 00 | .... | .... | 979 50 | Kingston | 355 50 | 624 00 | .... | 979 50 |
| 246 75 | .... | .... | .... | .... | 246 75 | Listowel | 60 75 | 186 00 | .... | 246 75 |
| 1,557 75 | .... | 1,725 00 | 5 00 | .... | 3,287 75 | London | 2,488 50 | 799 25 | .... | 3,287 75 |
| 135 75 | .... | .... | .... | .... | 135 75 | Napanee | 67 00 | 68 75 | .... | 135 75 |
| 2,648 00 | .... | .... | .... | .... | 2,648 00 | Ottawa | 634 50 | 2,013 50 | .... | 2,648 00 |
| 539 00 | .... | .... | .... | .... | 539 00 | Owen Sound | 115 25 | 423 75 | .... | 539 00 |
| 864 00 | .... | 175 00 | .... | .... | 1,039 00 | Peterborough | 107 50 | 931 50 | .... | 1,039 00 |
| 670 50 | .... | 175 00 | .... | .... | 845 50 | Sarnia | 224 75 | 620 75 | .... | 845 50 |
| 1,177 00 | .... | .... | .... | .... | 1,177 00 | Stratford | 146 50 | 1,030 50 | .... | 1,177 00 |
| 4,864 55 | .... | 6,000 00 | .... | .... | 10,864 55 | Toronto | 7,530 50 | 3,334 05 | .... | 10,864 55 |
| 18,744 55 | .... | 11,700 00 | 20 00 | .... | 30,464 55 | *Ontario* | 15,204 50 | 15,260 05 | .... | 30,464 55 |
| 1,111 00 | .... | 7,375 00 | .... | 5 55 | 8,491 55 | Montreal | 7,018 80 | 1,472 75 | .... | 8,491 55 |
| 727 00 | .... | 200 00 | .... | .... | 927 00 | Quebec | 361 25 | 565 75 | .... | 927 00 |
| 408 50 | .... | .... | .... | .... | 408 50 | Sherbrooke | 36 00 | 372 50 | .... | 408 50 |
| .... | .... | 1,230 00 | .... | .... | 1,230 00 | St. Hyacinthe | 53 50 | 1,176 50 | .... | 1,230 00 |
| 2,246 50 | .... | 8,805 00 | .... | 5 55 | 11,057 05 | *Quebec* | 7,469 55 | 3,587 50 | .... | 11,057 05 |
| 826 75 | .... | .... | .... | .... | 826 75 | Fredericton | 68 75 | 758 00 | .... | 826 75 |
| 809 50 | .... | 750 00 | .... | .... | 1,559 50 | St. John | 457 25 | 1,102 25 | .... | 1,559 50 |
| 1,636 25 | .... | 750 00 | .... | .... | 2,386 25 | *New Brunswick* | 526 00 | 1,860 25 | .... | 2,386 25 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 535 50 | ..... | 1,975 00 | ..... | ..... | 2,510 50 | *Halifax, N.S.* | 758 00 | 1,752 50 | ..... | 2,510 50 |
| 973 75 | ..... | ..... | ..... | ..... | 973 75 | *Charlottetown, P.E.I.* | 77 50 | 896 25 | ..... | 973 75 |
| 1,235 00 | ..... | 625 00 | ..... | ..... | 1,860 00 | *Winnipeg, Man* | 553 75 | 1,306 25 | ..... | 1,860 00 |
| 855 25 | ..... | ..... | ..... | ..... | 855 25 | Nanaimo | 65 00 | 790 25 | ..... | 855 25 |
| 1,312 50 | ..... | ..... | ..... | ..... | 1,312 50 | New Westminster | 185 25 | 1,127 25 | ..... | 1,312 50 |
| 1,237 50 | ..... | 500 00 | ..... | ..... | 1,737 50 | Vancouver | 145 75 | 1,591 75 | ..... | 1,737 50 |
| 1,056 50 | ..... | ..... | ..... | ..... | 1,056 50 | Victoria | 174 50 | 882 00 | ..... | 1,056 50 |
| 4,461 75 | ..... | 500 00 | ..... | ..... | 4,961 75 | *British Columbia* | 570 50 | 4,391 25 | ..... | 4,961 75 |
| 29,833 30 | ..... | 24,355 00 | 20 00 | 5 55 | 54,213 85 | Grand Totals | 25,159 80 | 29,054 05 | ..... | 54,213 85 |

Inland Revenue Department,
Ottawa, August 18, 1903

W. J. GERALD,
*Deputy Minister.*

## GAS

### No. 22.—Inspection Districts in

Dr.

*(For Details, see*

| Balances due by Inspectors July 1, 1902. | Amounts received from Department to meet Expenditures. | Deductions from Salaries for | | | Totals. | — |
|---|---|---|---|---|---|---|
| | | Superannuation. | Retirement. | Guarantee. | | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | |
| | 94 40 | 2 00 | | 3 60 | 100 00 | ..Barrie |
| | 710 94 | 7 04 | | 6 48 | 724 46 | ..Belleville |
| | 163 46 | | | 3 60 | 167 06 | ..Berlin |
| | 114 91 | | | | 114 91 | ..Brockville |
| | 158 85 | 2 00 | | 3 60 | 164 45 | ..Cobourg |
| | 141 20 | 2 00 | | 3 60 | 146 80 | ..Cornwall |
| | 206 04 | 4 00 | | 3 60 | 213 64 | ..Guelph |
| | 2,687 50 | 36 00 | | 7 20 | 2,730 70 | ..Hamilton |
| | 492 95 | | | 3 60 | 496 55 | ..Kingston |
| | 171 50 | | | 3 60 | 175 10 | ..Listowel |
| | 1,612 63 | | | 3 60 | 1,616 23 | ..London |
| | 35 70 | | | | 35 70 | ..Napanee |
| | 1,977 25 | | | 3 60 | 1,980 85 | ..Ottawa |
| | 317 40 | 4 00 | | 3 60 | 325 00 | ..Owen Sound |
| | 148 40 | | | 3 60 | 152 00 | ..Peterborough |
| | 119 45 | | | 1 80 | 121 25 | ..Sarnia |
| | 207 25 | 4 00 | | 3 60 | 214 85 | ..Stratford |
| | 3,366 62 | 34 04 | | 7 20 | 3,407 86 | ..Toronto |
| | 12,726 45 | 95 08 | | 65 88 | 12,887 41 | *Ontario* |
| | 3,112 12 | | | 5 40 | 3,117 52 | ..Montreal |
| | 1,427 90 | 25 96 | | 3 60 | 1,457 46 | ..Quebec |
| | 143 40 | 3 00 | | 3 60 | 150 00 | ..Sherbrooke |
| | 98 20 | | | 1 80 | 100 00 | ..St. Hyacinthe |
| | 4,781 62 | 28 96 | | 14 40 | 4,824 98 | *Quebec* |
| | 196 40 | | | 3 60 | 200 00 | ..Fredericton |
| | 1,181 09 | | | 3 60 | 1,184 69 | ..St. John |
| | 1,377 49 | | | 7 20 | 1,384 69 | *New Brunswick* |
| | 2,621 51 | 27 00 | | 7 20 | 2,655 71 | ..Halifax |
| 12 88 | | | | | 12 88 | ..Pictou |
| 12 88 | 2,621 51 | 27 00 | | 7 20 | 2,668 59 | *Nova Scotia* |
| | 316 22 | | | 3 60 | 319 82 | *Charlottetown, P.E.I.* |
| | 428 10 | | | 3 60 | 431 70 | *Winnipeg, Man.* |
| | 96 40 | | | 3 60 | 100 00 | ..Nanaimo |
| | 115 25 | | 5 00 | 3 60 | 123 85 | ..New Westminster |
| | 422 25 | 6 00 | | 3 60 | 431 85 | ..Vancouver |
| | 202 40 | 4 00 | | 3 60 | 210 00 | ..Victoria |
| | 836 30 | 10 00 | 5 00 | 14 40 | 865 70 | *British Columbia* |
| 200 00 | 902 70 | | | | 1,102 70 | ..General |
| | 497 95 | | | | 497 95 | ..General expenses |
| | 584 78 | | | | 584 78 | ..Printing |
| | 211 24 | | | | 211 24 | ..Stationery |
| 212 88 | 25,284 36 | 161 04 | 5 00 | 116 28 | 25,779 56 | *Grand totals* |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

INSPECTION.

Account with Expenditures, 1902–3.

*Appendix B.)* Cr.

| Expenditures authorized by the Department. | | | | | Balances due by Inspectors June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|
| Salaries. | Special Assistance. | Rent. | Travelling Expenses. | Sundries. | | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 100 00 | | | | | | 100 00 |
| 449 96 | | 231 25 | 7 70 | 35 55 | | 724 46 |
| 100 00 | | | 53 15 | 13 91 | | 167 06 |
| | 99 96 | | | 14 95 | | 114 91 |
| 100 00 | | | 33 30 | 31 15 | | 164 45 |
| 100 00 | | | | 46 80 | | 146 80 |
| 200 00 | | | | 13 64 | | 213 64 |
| 2,499 96 | | 36 00 | 130 05 | 64 69 | | 2,730 70 |
| 400 00 | | 45 00 | | 51 55 | | 496 55 |
| 100 00 | | 60 00 | | 15 10 | | 175 10 |
| 1,100 00 | 95 00 | | 284 30 | 136 93 | | 1,616 23 |
| | | | 31 15 | 4 55 | | 35 70 |
| 1.050 00 | 540 00 | 300 00 | 7 50 | 83 35 | | 1,980 85 |
| 200 00 | | 125 00 | | | | 325 00 |
| 150 00 | | | | 2 00 | | 152 00 |
| 100 00 | | 20 00 | | 1 25 | | 121 25 |
| 200 00 | | | | 14 85 | | 214 85 |
| 3,349 88 | | | | 57 98 | | 3,407 86 |
| 10,199 80 | 734 96 | 817 25 | 547 15 | 588 25 | | 12,887 41 |
| 2,299 92 | 356 00 | 240 00 | 81 40 | 140 20 | | 3,117 52 |
| 1,300 00 | | 150 00 | | 7 46 | | 1,457 46 |
| 150 00 | | | | | | 150 00 |
| 100 00 | | | | | | 100 00 |
| 3,849 92 | 356 00 | 390 00 | 81 40 | 147 66 | | 4,824 98 |
| 200 00 | | | | | | 200 00 |
| 1,100 00 | | | 77 16 | 7 53 | | 1,184 69 |
| 1,300 00 | | | 77 16 | 7 53 | | 1,384 69 |
| 1,899 96 | | 307 35 | 342 33 | 106 07 | | 2,655 71 |
| | | | | | 12 88 | 12 88 |
| 1,899 96 | | 307 35 | 342 33 | 106 07 | 12 88 | 2,668 59 |
| 300 00 | | | | 19 82 | | 319 82 |
| 300 00 | | 75 00 | | 56 70 | | 431 70 |
| 100 00 | | | | | | 100 00 |
| 100 00 | | | | 23 85 | | 123 85 |
| 300 00 | | | 74 25 | 57 60 | | 431 85 |
| 200 00 | | | | 10 00 | | 210 00 |
| 700 00 | | | 74 25 | 91 45 | | 865 70 |
| | | | 28 25 | 874 45 | 200 00 | 1.102 70 |
| | | | | 497 95 | | 497 95 |
| | | | | 584 78 | | 584 78 |
| | | | | 211 24 | | 211 24 |
| 18,549 68 | 1,090 96 | 1,589,60 | 1,150 54 | 3,185 90 | 212 88 | 25.779 56 |

W. J. GERALD,
*Deputy Minister.*

## ELECTRIC LIGHT INSPECTION, 1902-1903.

### No. 23.—INSPECTION DISTRICTS IN ACCOUNT WITH REVENUE.

DR. CR.

| Balances July 1, 1902. | | Stamps issued to Inspectors. | Registration Fees accrued. | Penalties. | Totals. | | Deposited to the Credit of the Receiver General. | | Balances June 30, 1903. | | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stamps on hand. | Cash on hand. | | | | | | Registration Fees. | Inspection Fees. | Stamps on hand. | Cash on hand. | |
| $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 1,517 75 | | 575 00 | 500 00 | | 2,592 75 | Belleville | 500 00 | 453 75 | 1,639 00 | | 2,592 75 |
| 1,961 75 | | 737 50 | 300 00 | | 2,999 25 | Hamilton | 300 00 | 831 00 | 1,868 25 | | 2,999 25 |
| 2,029 00 | | 900 00 | 540 00 | 5 00 | 3,474 00 | London | 540 00 | 991 00 | 1,943 00 | | 3,474 00 |
| 7,180 25 | | 2,650 00 | 310 00 | | 10,140 25 | Ottawa | 310 00 | 3,280 25 | 6,550 00 | | 10,140 25 |
| 8,037 00 | | 3,250 00 | 830 00 | | 12,117 00 | Toronto | 830 00 | 3,372 75 | 7,914 25 | | 12,117 00 |
| 20,725 75 | | 8,112 50 | 2,480 00 | 5 00 | 31,323 25 | *Ontario* | 2,480 00 | 8,928 75 | 19,914 50 | | 31,323 25 |
| 3,879 75 | | 4,700 00 | 170 00 | 5 00 | 8,754 75 | Montreal | 170 00 | 4,950 75 | 3,634 00 | | 8,754 75 |
| 2,147 00 | | 750 00 | 140 00 | | 3,037 00 | Quebec | 140 00 | 899 50 | 1,997 50 | | 3,037 00 |
| 121 25 | | 275 00 | 170 00 | | 566 25 | Sherbrooke | 170 00 | 162 25 | 234 00 | | 566 25 |
| 1,330 00 | | | 130 00 | | 1,460 00 | St. Hyacinthe | 130 00 | 265 75 | 1,064 25 | | 1,460 00 |
| | | 375 00 | 55 00 | | 430 00 | Three Rivers | 55 00 | 116 50 | 258 50 | | 430 00 |
| 7,478 00 | | 6,100 00 | 665 00 | 5 00 | 14,248 00 | *Quebec* | 665 00 | 6,394 75 | 7,188 25 | | 14,248 00 |
| 1,822 50 | | 1,250 00 | 140 00 | | 3,212 50 | *St. John, N.B.* | 140 00 | 1,059 25 | 2,013 25 | | 3,212 50 |
| 1,896 75 | | 875 00 | 305 00 | | 3,076 75 | *Halifax, N.S.* | 305 00 | 731 50 | 2,040 25 | | 3,076 75 |
| 334 00 | | 250 00 | 40 00 | | 624 00 | *Charlottetown, P.E.I.* | 40 00 | 124 75 | 459 25 | | 624 00 |
| 1,224 50 | | 725 00 | 230 00 | | 2,179 50 | *Winnipeg, Man.* | 230 00 | 704 75 | 1,244 75 | | 2,179 50 |
| 1,916 75 | | 1,300 00 | 230 00 | | 3,446 75 | Vancouver | 230 00 | 1,141 25 | 2,075 50 | | 3,446 75 |
| 1,042 00 | | 925 00 | 65 00 | | 2,032 00 | Victoria | 65 00 | 654 75 | 1,312 25 | | 2,032 00 |
| 2,958 75 | | 2,225 00 | 295 00 | | 5,478 75 | *British Columbia* | 295 00 | 1,796 00 | 3,387 75 | | 5,478 75 |
| 36,440 25 | | 19,537 50 | 4,155 00 | 10 00 | 60,142 75 | Grand totals | 4,155 00 | 19,739 75 | 36,248 00 | | 60,142 75 |
| | | | 15 00 | | 15 00 | Less Refunds, as per Statement No. 16 | 15 00 | | | | 15 00 |
| 36,440 25 | | 19,537 50 | 4,140 00 | 10 00 | 60,127 75 | | 4,140 00 | 19,739 75 | 36,248 00 | | 60,127 75 |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## ELECTRIC LIGHT INSPECTION, 1902–1903.

DR. No. 24.—Inspection Districts in Account with Expenditures. CR.

| Amounts received from Department to meet expenditures. | Guarantee. | Totals. | | Expenditures Authorized by the Department. | | | | Totals. |
|---|---|---|---|---|---|---|---|---|
| | | | | Salaries. | Special Assistance. | Travelling Expenses. | Sundries. | |
| $ cts. | $ cts. | $ cts. | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| 290 43 | | 290 43 | Belleville | | | 277 22 | 13 21 | 290 43 |
| 85 25 | | 85 25 | Hamilton | | | 83 30 | 1 95 | 85 25 |
| 194 29 | | 194 29 | London | | | 142 35 | 51 94 | 194 29 |
| 2 50 | | 2 50 | Owen Sound | | | | 2 50 | 2 50 |
| 239 63 | | 239 63 | Toronto | | | 234 38 | 5 25 | 239 63 |
| 424 90 | | 424 90 | Montreal | | 374 00 | 36 65 | 14 25 | 424 90 |
| 74 42 | | 74 42 | Quebec | | | 4 96 | 69 46 | 74 42 |
| 74 97 | | 74 97 | Sherbrooke | | | 63 76 | 11 21 | 74 97 |
| 346 40 | 1 80 | 348 20 | St. Hyacinthe | 300 00 | | 46 90 | 1 30 | 348 20 |
| 520 48 | 1 65 | 522 13 | Three Rivers | 458 26 | | 25 40 | 38 47 | 522 13 |
| 137 58 | | 137 58 | St. John | | | 133 20 | 4 38 | 137 58 |
| 246 75 | | 246 75 | Halifax | | | 244 00 | 2 75 | 246 75 |
| 30 53 | | 30 53 | Charlottetown | | | 7 30 | 23 23 | 30 53 |
| 48 15 | | 48 15 | Victoria | | | 38 90 | 9 25 | 48 15 |
| 3,132 42 | | 3,132 42 | Chief Electrical Engineer | 2,764 19 | | 191 86 | 176 37 | 3,132 42 |
| 1,939 05 | | 1,939 05 | General | | | | 1,939 05 | 1,939 05 |
| 689 55 | | 689 55 | Printing | | | | 689 55 | 689 55 |
| 19 99 | | 19 99 | Stationery | | | | 19 99 | 19 99 |
| 8,497 29 | 3 45 | 8,500 74 | Totals | 3,522 45 | 374 00 | 1,530 18 | 3,074 11 | 8,500 74 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

DR. No. 25.—STATEMENT showing the transactions in connection with the manufacture of Methylated Spirits, 1902-1903. CR.

| — | Amounts. | Totals. |
|---|---|---|
| | $ cts. | $ cts. |
| To stock on hand, July 1, 1902, viz. | | 13,906 10 |
| Wood Naphtha, 8,293·01 Proof Galls. = 4,960·07 Std. Galls. at $1.40 | 6,944 10 | |
| Methylated Spirits, 6,213·26 Proof Galls. = | | |
| 3,205·03 Std. Galls. No. 1 at $1.00 | 3,525 53 | |
| 547·41 " No. 2 at $1.50 | 821 11 | |
| Alcohol, 6,475·43 Proof Galls. at 25c | 1,618 86 | |
| Drums, 8 at $8 and 9 at $10 | 154 00 | |
| Barrels, 337 at $2.50 | 842 50 | |
| To Stock sold in 1901-02 and not paid until after July 1, 1902 | | 1,360 55 |
| Methylated Spirits, 1,843·59 Proof Galls. = | | |
| 453·05 Std. Galls. at $1.08 | 489 29 | |
| 435·40 " $1.10 | 588 94 | |
| 124·88 " $1.50 | 187 32 | |
| Drums, 6 at $10 | 60 00 | |
| Barrels, 14 at $2.50 | 35 00 | |
| To Disbursements for purchases, &c. | | 41,322 94 |
| Alcohol, 68,078·92 Proof. Galls. at 25c | 17,019 74 | |
| Wood Naphtha, 19,674·87 Proof Galls. = 11,774·60 Std. Galls. at $1.40 | 16,484 44 | |
| Drums, 58 at $6.50, 32 at $8 and 248 at $10 | 3,113 00 | |
| Barrels, 1,851 at $2.50 and 60 at $3 | 4,807 50 | |
| Sundries | 5 05 | |
| | 41,429 73 | |
| Less 3·30 Galls. of Alcohol sold 82c., and freight $105.97 | 106 79 | |

| — | Amounts. | Totals. |
|---|---|---|
| | $ cts. | $ cts. |
| By Goods sold as follows | | 72,252 39 |
| Methylated Spirits, 94,187·03 Proof Galls. = | | |
| 13,408·50 Std. Galls. at $1.08 | 14,481 18 | |
| 35,537·15 " $1.10 | 39,090 86 | |
| 7,373·64 " $1.50 | 11,060 46 | |
| Drums, 264 at $10, 31 at $8 | 2,888 00 | |
| Barrels, 1,825 at $2.50, 60 at $3 | 4,742 50 | |
| Cartage, 80c.; cans, $5 | 5 80 | |
| | 72,268 80 | |
| Less refunded for loss in transit, $11.36 (M. Spirits) and $4.15 repairs to drums | 16 41 | |
| By Stock sold and not paid for, up to June 30, 1903 | | 2,412 16 |
| Methylated Spirits, 2,706·28 Proof Galls. = | | |
| 633·06 Std. Galls. at $1.08 | 683 70 | |
| 712·34 " $1.10 | 783 57 | |
| 288·83 " $1.50 | 433 24 | |
| Drums, 8 at $10 | 80 00 | |
| Barrels, 75 at $2.50 | 187 50 | |
| By 846·62 Proof Galls. Alcohol, purchased at 25c. per gall. and not entered in warehouse until after June 30, 1903, and 13 barrels at $2.50 | 244 15 | |
| By Goods used in manufacture | | |
| Wood Naphtha, 25,255·34 Proof Galls. = 15,120·06 Std. Galls. | | |
| Alcohol, 68,444·23 Proof Galls. | | |
| Barrels destroyed, 59. | | |

| | | | | | |
|---|---|---|---|---|---|
| To other expenses as follows | | 7,865 44 | By stock on hand June 30, 1902 | | 7,759 70 |
| Rent of warehouse | 800 00 | | Wood Naphtha, 2,712·54 Proof Galls. = 1,614·61 Std. Galls. at $1.10 | 2,260 40 | |
| Salaries | 5,544 00 | | Methylated Spirits, 4,268·79 Proof Galls.,— | | |
| Freight | 625 38 | | 2,088·96 Std. Galls No. 1 at $1.10 | 2,297 86 | |
| Stationery, $19.23; printing, $148.34 | 167 57 | | 489·26 " No. 2 at $1·50 | 733 89 | |
| Sundries, including rent of motor power, heating, lighting, &c | 728 49 | | Alcohol, 5,260·20 Proof Galls. at 25c | 1,315 05 | |
| | | | Drums, 58 at $10 | 580 00 | |
| | | | Barrels, 229 at $2.50 | 572 50 | |
| Manufactured during the year— Methylated Spirits, 92,242·56 Proof Galls. | | | | | |
| Net profit | | 17,969 22 | | | |
| Total | | 82,424 25 | Total | | 82,424 25 |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

No. 26.—STATEMENT showing the Amounts voted, and the Expenditures authorized for each service, for the Year ended June 30, 1903.

| Services. | Grants. | Expenditures. | Over-Expenditures. | Under-Expenditures. |
|---|---|---|---|---|
| | $ cts. | $ cts. | $ cts. | $ cts. |
| Minister's salary | 7,000 00 | 7,000 00 | | |
| Department salaries | 35,460 00 | 34,360 00 | | 1,100 00 |
| " contingencies | 7,300 00 | 4,789 24 | | 2,510 76 |
| Excise salaries | 327,429 37 | 322,722 68 | | 4,706 69 |
| " contingencies | 58,000 00 | 57,479 58 | | 520 42 |
| " " on account of stamps | 26,000 00 | 26,000 00 | | |
| Commission to Customs officers | 5,500 00 | 5,478 94 | | 21 06 |
| Duty pay | 6,400 00 | 6,247 91 | | 152 09 |
| " other than special surveys | 1,000 00 | 650 00 | | 350 00 |
| Preventive service | 13,000 00 | 10,755 59 | | 2,244 41 |
| Minor revenues | 2,200 00 | 1,507 81 | | 692 19 |
| Tobacco stamp commission | 100 00 | 50 84 | | 49 16 |
| Weights and measures salaries | 55,179 78 | 55,179 78 | | |
| " " contingencies | 26,000 00 | 24,860 40 | | 1,139 60 |
| " " special vote | 6,920 22 | 6,883 73 | | 36 49 |
| Gas and electric light inspection salaries | 22,250 00 | 22,072 13 | | 177 87 |
| " " contingencies | 12,000 00 | 11,995 29 | | 4 71 |
| Adulteration of food | 25,100 00 | 19,841 13 | | 5,258 87 |
| Methylated spirits | 65,000 00 | 49,188 38 | | 15,811 62 |
| Metric system supplies | 500 00 | 393 79 | | 106 21 |
| L. A. Fréchette, translation | 100 00 | 95 42 | | 4 58 |
| C. Perkins | 80 00 | 80 00 | | |
| Provisional allowance | 500 00 | 149 97 | | 350 03 |
| E. Forest | 85 00 | 85 00 | | |
| M. J. Kelly | 159 90 | 159 90 | | |
| A. Guay | 30 00 | 30 00 | | |
| | 703,294 27 | 668,057 51 | | 35,236 76 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

# APPENDIX A

# STATISTICS

## APPENDIX A—SPIRITS.

### No. 1.—Return of Manufactures for the year ended June 30, 1903.

| Divisions. | Licenses. | | Grain, &c., Used for Distillation. | | | | | | Total Grain used for Distillation. | Proof Spirits Manufactured. | Duty Collected ex-Manufactory, on Deficiencies and Assessments. | | Total Duty Collected ex-Manufactory, including License Fees. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Fees. | Malt. | Indian Corn. | Rye. | Oats. | Wheat. | Molasses. | | | | | |
| | | $ | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Galls. | Galls. | $ cts. | $ cts. |
| Belleville, Ont.... | 1 | 250 | 143,995 | 2,649,955 | 1,353,405 | 18,400 | .... | .... | 4,165,755 | 236,946·94 | .... | .... | 250 00 |
| Guelph " .... | 1 | 250 | 274,840 | 4,443,100 | 925,500 | 47,460 | 60,300 | .... | 5,751,200 | 322,414·67 | 46·58 | 88 50 | 338 50 |
| Hamilton " .... | 1 | 250 | 159,931 | 1,690,262 | 568,607 | 11,738 | 1,976,662 | .... | 4,407,200 | 259,992·28 | 134·52 | 255 58 | 505 58 |
| Perth " .... | 2 | 500 | 262,300 | .... | .... | .... | .... | .... | 262,300 | 14,417·84 | .... | .... | 500 00 |
| Prescott " .... | 1 | 250 | 264,901 | 5,165,740 | 1,041,250 | 65,394 | .... | .... | 6,537,285 | 377,808·75 | .... | .... | 250 00 |
| Toronto " .... | 1 | 250 | 665,800 | 11,177,735 | 2,491,045 | 138,510 | .... | .... | 14,473,090 | 873,527·33 | .... | .... | 250 00 |
| Windsor " .... | 1 | 250 | 1,417,824 | 23,292,000 | 4,335,800 | 194,100 | .... | .... | 29,239,724 | 1,716,406·82 | 837·99 | 1,707 59 | 1,957 59 |
| Totals........ | 8 | 2,000 | 3,189,591 | 48,418,792 | 10,715,607 | 475,602 | 2,036,962 | .... | 64,836,554 | 3,801,514·63 | 1,019·09 | 2,051 67 | 4,051 67 |
| Joliette, Que...... | 1 | 250 | 1,245,725 | 1,097,120 | 1,319,410 | .... | .... | .... | 3,662,255 | 182,902·71 | .... | .... | 250 00 |
| Montreal " ...... | 1 | 250 | .... | .... | .... | .... | .... | 1,514,687 | .... | 79,185·87 | .... | .... | 250 00 |
| Totals........ | 2 | 500 | 1,245,725 | 1,097,120 | 1,319,410 | .... | .... | 1,514,687 | 3,662,255 | 262,088·58 | .... | .... | 500 00 |
| Grand Totals..... | 10 | 2,500 | 4,435,316 | 49,515,912 | 12,035,617 | 475,602 | 2,036,962 | 1,514,687 | 68,498,809 | 4,063,603·21 | 1,019·09 | 2,051 67 | 4,551 67 |

Inland Revenue Department,
Ottawa, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

APPENDIX A—*Continued*—SPIRITS.

No. 2. COMPARATIVE STATEMENT of Manufactures for the years ended June 30, 1902 and 1903.

| Provinces. | Licenses. | | Grain, &c., Used for Distillation. | | | | | | Total Grain used for Distillation. | Proof Spirits Manufactured. | Duty Collected ex-Manufactory, on Deficiencies and Assessments. | | Total Duty Collected ex-Manufactory, including License Fees. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Fees. | Malt. | Indian Corn. | Rye. | Oats. | Wheat. | Molasses. | | | | | |
| 1902. | | $ | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Galls. | Galls. | $ cts. | $ cts. |
| Ontario.......... | 9 | 2,250 | 2,570,961 | 40,684,021 | 8,590,822 | 413,965 | 29,470 | ........ | 52,289,239 | 3,111,605·82 | 2,487·57 | 4,817 49 | 7,067 49 |
| Quebec........ | 1 | 250 | 861,105 | 713,850 | 858,235 | ........ | ........ | ........ | 2,433,190 | 122,511·48 | ........ | ........ | 250 00 |
| Totals........ | 10 | 2,500 | 3,432,066 | 41,397,871 | 9,449,057 | 413,965 | 29,470 | ........ | 54,722,429 | 3,234,117·30 | 2,487·57 | 4,817 49 | 7,317 49 |
| 1903. | | | | | | | | | | | | | |
| Ontario.......... | 8 | 2,000 | 3,189,591 | 48,418,792 | 10,715,607 | 475,602 | 2,036,962 | ........ | 64,836,554 | 3,801,514·63 | 1,019·09 | 2,051 67 | 4,051 67 |
| Quebec........ | 2 | 500 | 1,245,725 | 1,097,120 | 1,319,410 | ........ | ........ | 1,514,687 | 3,662,255 | 262,088·58 | ........ | ........ | 500 00 |
| Totals........ | 10 | 2,500 | 4,435,316 | 49,515,912 | 12,035,017 | 475,602 | 2,036,962 | 1,514,687 | 68,498,809 | 4,063,603·21 | 1,019·09 | 2,051 67 | 4,551 67 |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—SPIRITS.

No. 3.—STATEMENT showing the transactions in the Distilleries in the

| Divisions. | In process, including deficiencies brought forward. | Manufactured during the year, including surpluses. | RETURNED TO DISTILLERY FOR REDISTILLATION. | | Received from other sources, duty paid. |
|---|---|---|---|---|---|
| | | | Duty paid. | In bond. | |
| | Gallons. | Gallons. | Gallons. | Gallons. | Gallons. |
| Belleville, Ont. | 1,407·97 | 236,946·94 | ........... | 513·00 | 908·97 |
| Guelph „ | 32,807·55 | 322,414·67 | ........... | 4,399·84 | 1,792 92 |
| Hamilton „ | 968·95 | 259,992·28 | ........... | *177·09<br>32,384·83 | 220·13 |
| Perth „ | 109·10 | 14,417·84 | ........... | ........... | ........... |
| Prescott „ | 11,004·78 | 377,808 75 | ........... | 627·96 | 757·66 |
| Toronto „ | 6,482·49 | 873,527·33 | 537·89 | 587,028·94 | 1,723·65 |
| Windsor „ | 86,056·49 | 1,716,406·82 | ........... | 245,276·34 | 759·15 |
| Totals | 138,837·33 | 3,801,514·63 | 537·89 | 177·09<br>870,230·91 | 6,162·48 |
| Joliette, Que. | 2,946·05 | 182,902·71 | ........... | ........... | ........... |
| Montreal „ | ........... | 79,185·87 | ........... | ........... | ........... |
| Totals | 2,946·05 | 262,088·58 | ........... | ........... | ........... |
| Grand Totals | 141,783·38 | 4,063,603·21 | 537·89 | *177·09<br>870,230·91 | 6,162·48 |

* Soakage.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

Dominion of Canada during the year ended June 30, 1903.

| Totals. | Warehoused during the year. | Fusel Oil written off. | Written off. | Deficiencies on which duty was collected. | In process, including deficiencies carried forward. | Totals. |
|---|---|---|---|---|---|---|
| Gallons. | Gallons. | Gallons. | Gallons. | Gallons. | Gallons. | Gallons. |
| 239,776·88 | 236,514·94 | 1,407·97 | .......... | .......... | 1,853·97 | 239,776·88 |
| 361,414·98 | 338,936·30 | 1,268·07 | .......... | 46·58 | 21,164·03 | 361,414·98 |
| 293,743·28 | 292,700·22 | 253·94 | .......... | 134·52 | 654·60 | 293,743·28 |
| 14,526·94 | 14,425·90 | .......... | .......... | .......... | 101·04 | 14,526·94 |
| 390,199·15 | 365,879·70 | 746·88 | .......... | .......... | 23,572·57 | 390,199·15 |
| 1,469,300·30 | 1,457,351·49 | 2,739·45 | .......... | .......... | 9,209·36 | 1,469,300·30 |
| 2,048,498·80 | 1,991,074·58 | 3,879·04 | .......... | 837·99 | 52,707·19 | 2,048,498·80 |
| 4,817,460·33 | 4,696,883·13 | 10,295·35 | .......... | 1,019·09 | 109,262·76 | 4,817,460·33 |
| 185,848·76 | 182,981·14 | .......... | .......... | .......... | 2,867·62 | 185,848·76 |
| 79,185·87 | 73,710·94 | .......... | 2·81 | .......... | 5,472·12 | 79,185·87 |
| 265,034·63 | 256,692·08 | .......... | 2·81 | .......... | 8,339·74 | 265,034·63 |
| 5,082,494·96 | 4,953,575·21 | 10,295·35 | 2·81 | 1,019·09 | 117,602·50 | 5,082,494·96 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—SPIRITS.

DR. No. 4.—WAREHOUSE RETURN

| Remaining in Warehouse from last year. | Placed in Warehouse. | Imported. | Received from other Divisions. | Totals. | DIVISIONS. | Entered for Consumption. | |
|---|---|---|---|---|---|---|---|
| Galls. | Galls. | Galls. | Galls. | Galls. | | Galls. | $ cts. |
| 621,946·87 | 236,514·94 | .......... | 13,614·47 | 872,076·28 | Belleville, Ont. | 50,596·85 | 96,134 08 |
| 2,295·82 | ............ | .......... | 31,867·54 | 34,163·36 | Brantford " | 15,336·52 | 29,141 04 |
| 654·96 | ........ .. | .......... | 4,702·37 | 5,357·33 | Cornwall " | 4,632·57 | 8,802 05 |
| 869,641·51 | 338,936·30<br>*5·96 | .... ... | 73,771·11 | 1,282,348·92 | Guelph " | 289,186·85 | 549,457 47 |
| 494,757·09 | 292,700·22 | .... ... | 99,269·77 | 886,733·04 | Hamilton " | 123,343·81 | 234,361 00 |
| 3,880·92 | ............ | .......... | 46,183·28 | 50,064·20 | Kingston " | 38,476·57 | 73,111 17 |
| 6,842·41 | ............ | .......... | 38,953·94 | 45,796·35 | London " | 39,356·58 | 74.780 90 |
| 23,654·39 | ............ | ... .... | 145,353·84 | 169,008·23 | Ottawa " | 144,648·99 | 274,908 02 |
| 6,475·43 | ........... | ..... ... | 68,078·92 | 74,554·35 | " Gov. Wse " | .... ....... | ........ .. |
| ............ | ............ | ..... .... | 78·42 | 78·42 | " Dep. Lab. " | .... .. .... | ...... |
| 1,258·41 | ........... | .... ... | 11,603·40 | 12,861·81 | Owen Sound " | 11,728·48 | 22,283 64 |
| 67,846·34 | 14,425·90 | ... ...... | 33,983·00 | 116,255·24 | Perth " | 44,223·77 | 84,254 28 |
| 4,932·95 | ........... | .......... | 24,369·84 | 29,302·79 | Peterboro' " | 22,694·71 | 43,125 58 |
| 2,510·29 | ........... | .. ... .... | 16,340·49 | 18,850·78 | Port Arthur " | 15,220·97 | 28,931 66 |
| 736,021·20 | 365,879·70 | 163,449·60 | 8,570·94 | 1,273,921·44 | Prescott " | 28,029·86 | 102,290 81 |
| 631·13 | .... ..... | .......... | 8,443·47 | 9,074·60 | St. Cath'ines " | 7,868·60 | 14,950 15 |
| 2,092·69 | .......... | .... .... | 19,315·29 | 21,407·98 | Stratford " | 18,782·42 | 35,691 44 |
| 3,306,367·26 | 1,457,351·49 | ......... | 146,640·55 | 4,910,359·30 | Toronto " | 392,810·13 | 741,912 10 |
| 3,886,994·85 | 1,991,074·58 | 7,778·95 | 65,018·82 | 5,950,867·20 | Windsor " | 188,744·81 | 359,101 13 |
| 10,038,804.52 | 4,696,889·09 | 171,228·55 | 856,159·46 | 15,763,081·62 | ..Totals ...... | 1,435,682 49 | 2,773,236 52 |
| 257,809·84 | 182,981·14 | ... . . . . | 27,530·23 | 468,321·21 | Joliette, Que. | 27,592·82 | 52,486 43 |
| 95,026·87 | 73,710·94 | ‡115·54 | 890,900·75 | 1,059,754·10 | Montreal " | 787,673·37 | 1,497,383 92 |
| 25,846·73 | .. ........ | ... ...... | 276,999·05 | 302,845·78 | Quebec " | 258,286·58 | 490,914 24 |
| 8,773·86 | ... ........ | .... ... | 110,133·99 | 118.907·85 | St. Hya'nthe " | 79,047·71 | 150,266 84 |
| 4,679·91 | ....... .... | 57,251·21 | 75,453·18 | 137,384·30 | Sherbrooke " | 74,412·24 | 158,594 06 |
| 7,121·31 | ... ...... | ......... | 29,107·76 | 36,229·07 | Three Rivers " | 29,716·56 | 56,486 52 |
| 399,258·52 | 256,692·08 | 57,366·75 | 1,410,124·96 | 2,123,442·31 | ..Totals . .. | 1,256,729·28 | 2,406,132 01 |
| 13,219·94 | ............ | . ... ... | 82,078·04 | 95,297·98 | St. John, N.B.. | 76,605·79 | 145,555 83 |
| 6,076·97 | ........... | .... ... | 30,690·29 | 36,767·26 | Halifax, N.S.. | 30.873·36 | 58,664 97 |
| ..... .... | .......... | ........ | 682·66 | 682·66 | Pictou " .. | 489·26 | 929 59 |
| 6,076·97 | .... ...... | .... .... | 31,372·95 | 37,449·92 | ..Totals .... | 31,362·62 | 59,594 56 |
| 409·67 | ... ........ | .... ..... | 166·73 | 576·40 | Charlot'n, P.E.I | 508·38 | 965·84 |
| 34,716·97 | .. ...... | ... ...... | 246,348·02 | 281,064·99 | Winnipeg, Man. | 232,003·75 | 440,515 74 |
| 8,040·61 | .... ....... | ......... | 26,631·55 | 34,672·16 | Calga'y, N.W.T | 25,035·67 | 47,574 44 |
| 36,892·58 | .. ......... | .......... | 94,241·02 | 131,133·60 | Vancouver, B.C | 82,373·14 | 156,526 35 |
| 17,375·54 | ........... | .......... | 82,972 84 | 100,348·38 | Victoria " | 62,998·16 | 119,721 30 |
| 54,268·12 | ........... | .......... | 177,213·86 | 231,481·98 | ..Totals ...... | 145,371 30 | 276,247 65 |
| .... ...... | ....... .. . | .......... | 10,327·45 | 10,327·45 | Dawson, Y.T.. | 4,448·84 | 8,452 63 |
| 8,612·54 | .......... | .......... | ........... | 8,612·54 | Sundries.... .. | ........... | ........... |
| 10,563,407·86 | 4,953,575·21<br>*5·96 | 228,479·76<br>‡115·54 | 2,840,423·02 | 18,586,007·35 | ..Grand Totals. | 3,207,748·12 | 6,158,275·22 |

*Surplus. ‡Seizure. This amount includes $68,543.92 collected on Imported Spirits used in Bonded Factories, at 30c. per gallon.

DEPARTMENT OF INLAND REVENUE,
OTTAWA, August 18, 1903.

for the year ended June 30, 1903. Cr.

| Removed in Bond. | | Free. | | Exported. | Used in Bonded Factories. | Remaining in Warehouse. | Totals. |
|---|---|---|---|---|---|---|---|
| To other Divisions. | To Distillery for Re-distillation. | Legal Allowance. | Other. | | | | |
| Galls. | Galls. | Galls. | Galls. | Galls. | Galls. | Galls. | Galls. |
| 234,103·31 | 513·00 | 6,344·29 | 801·50 | 320·73 | .... | 579,396·60 | 872,076·28 |
| .... | .... | .... | .... | .... | 11,815·71 | 7,011·13 | 34,163·36 |
| .... | .... | .... | .... | .... | .... | 724·76 | 5,357·33 |
| 124,804·12 | 4,399·84 | 23,205·98 | 3,309·94 | 12,887·12 | .... | 824,555·07 | 1,282,348·92 |
| 173,070·29 | 32,384·83 | 8,448·05 | 434·71 | 652·48 | 23,077·52 | 525,321·35 | 886,733·04 |
| 110·96 | .... | .... | .... | 21·84 | 8,368·39 | 3,086·44 | 50,064·20 |
| .... | .... | .... | .... | 11·73 | .... | 6,428·04 | 45,796·35 |
| .... | .... | .... | 256·36 | .... | .... | 24,102·88 | 169,008·23 |
| .... | .... | .... | 3·30 | .... | † 68,444·23 | 6,106·82 | 74,554·35 |
| .... | .... | .... | 78·42 | .... | .... | .... | 78·42 |
| .... | .... | .... | .... | .... | .... | 1,133·33 | 12,861·81 |
| 2,908·94 | .... | 1,066·82 | 675·91 | .... | .... | 67,379·80 | 116,255·24 |
| .... | .... | .... | .... | 443·03 | .... | 6,165·05 | 29,302·79 |
| .... | .... | .... | .... | .... | .... | 3,629·81 | 18,850·78 |
| 332,991.57 | 627·96 | 4,078·47 | 772·09 | 1,554·45 | 163,449·60 | 742,417·44 | 1,273,921·44 |
| 328·61 | .... | .... | .... | 74·70 | .... | 802·69 | 9,074·60 |
| .... | .... | .... | .... | .... | .... | 2,625·56 | 21,407·98 |
| 1,000,905·86 | 587,028·94 | 32,343·23 | 1,172·85 | 7,245·39 | 58,316·41 | 2,830,536·49 | 4,910,359·30 |
| 802,517·63 | 245,276·34 | 154,033·02 | 51·49 | 130,982·34 | 7,778·95 | 4,421,482·62 | 5,950,867·20 |
| 2,671,741·29 | 870,230·91 | 229,519·86 | 7,556·57 | 154,193·81 | 272,806·58<br>† 68,444·23 | 10,052,905·88 | 15,763,081·62 |
| 88,495·87 | .... | 130·31 | .... | .... | .... | 352,102·21 | 468,321·21 |
| 52,215·65 | .... | .... | .... | 712·69 | 53,349·75 | 165,802·64 | 1,059,754·10 |
| 4,769·21 | .... | .... | 393·86 | .... | 7,717·48 | 31,678·65 | 302,845·78 |
| 4,196·78 | .... | .... | .... | .... | 20,645·80 | 15,017·56 | 118,907·85 |
| .... | .... | .... | .... | .... | 57,251·21 | 5,720·85 | 137,384·30 |
| .... | .... | .... | .... | .... | .... | 6,512·51 | 36,229·07 |
| 149,677·51 | .... | 130·31 | 393·86 | 712·69 | 138,964.24 | 576,834·42 | 2,123,442·31 |
| 1,094·70 | .... | .... | .... | 9·49 | 6,859·77 | 10,728·23 | 95,297·98 |
| 682·66 | .... | .... | .... | 113·54 | .... | 5,097·70 | 36,767·26 |
| .... | .... | .... | .... | .... | .... | 193·40 | 682·66 |
| 682·66 | .... | .... | .... | 113·54 | .... | 5,291·10 | 37,449·92 |
| .... | .... | .... | .... | .... | .... | 68·02 | 576·40 |
| 1,987·36 | .... | .... | .... | 116·66 | .... | 46,957·22 | 281,064·99 |
| .... | .... | .... | .... | .... | .... | 9,636·49 | 34,672·16 |
| 7,748·24 | .... | .... | 106·73 | 304·46 | .... | 40,601·03 | 131,133·60 |
| 7,491·26 | .... | .... | 69·13 | 2,215·72 | .... | 27,574·11 | 100,348·38 |
| 15,239·50 | .... | .... | 175·86 | 2,520·18 | .... | 68,175·14 | 231,481·98 |
| .... | .... | .... | .... | .... | .... | 5,878·61 | 10,327·45 |
| .... | .... | .... | .... | .... | .... | 8,612·54 | 8,612·54 |
| 2,840,423·02 | 870,230·91 | 229,650·17 | 8,126·29 | 157,666·37 | 418,630·59<br>+68,444·23 | 10,785,087·65 | 18,586,007·35 |

† Used in the manufacture of Methylated Spirits at the Government Warehouse, Ottawa.

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A.—*Continued*—SPIRITS.

DR. No. 5.—COMPARATIVE STATEMENT of Warehouse

| Remaining in Warehouse from last year. | Placed in Warehouse | Imported. | Received from other Divisions. | Totals. | PROVINCES. | Entered for Consumption. | |
|---|---|---|---|---|---|---|---|
| Galls. | Galls. | Galls. | Galls. | Galls. | 1902. | Galls. | $ cts. |
| 10,392,017·15 | 3,537,470·81 | 137,104·36 | 809,616·64 | 14,876,208·96 | Ontario ........ | 1,324,365·02 | 2,549,691 70 |
| 342,580·72 | 130,815·69 | 50,677·82 | 1,304,111·30 | 1,828,185·53 | Quebec ......... | 1,157,121·25 | 2,205,538 31 |
| 13,966·71 | .... ..... | ............ | 76,650·02 | 90,616·73 | N. Brunswick... | 70,478·74 | 133,911 23 |
| 7,346·43 | .......... | ... ....... | 33,535·60 | 40,882·03 | Nova Scotia.... | 34,202·21 | 64,984 17 |
| 309·98 | ....... . | ...... .... | 472·51 | 782·49 | P. E. Island.... | 372·82 | 708 39 |
| 31,008·11 | .. ........ | ............ | 190,837·11 | 221,845·22 | Manitoba ...... | 185,482·32 | 352,225 36 |
| 6,137·96 | .......... | ........ .... | 18,965·92 | 25,103·88 | N.-W. Territor's | 17,063·27 | 32,425 21 |
| 51,590·77 | .... ..... | 44·48 | 157,855·39 | 209,490·64 | B. Columbia.... | 144,097·32 | 273,811 12 |
| 8,612·54 | .. ........ | ............ | ... ..... | 8.612·54 | Sundries........ | ............ | ..... ..... |
| 10,853,570·37 | 3,668,286·50 | 187,826·66 | 2,592,044·49 | 17,301,728·02 | ....Totals..... | 2,933,182·95 | 5,613,295 49 |
| | | | | | 1903. | | |
| 10,038,804·52 | *5 96<br>4,696,883·13 | 171.228·55 | 856,159·46 | 15,763,081·62 | Ontario..... ... | 1,435,682·49 | 2,773,236 52 |
| 399,258·52 | 256,692·08 | †115·54<br>57,251·21 | 1,410,124·96 | 2,123.442·31 | Quebec... ..... | 1,256,729·28 | 2,406,132 01 |
| 13,219·94 | ........... | ............ | 82,078·04 | 95,297·98 | New Brunswick. | 76.605·79 | 145,555 83 |
| 6,076·97 | .... ..... | ............. | 31,372·95 | 37,449·92 | Nova Scotia ... | 31,362·62 | 59,594 56 |
| 409·67 | ...... | ............ | 166 73 | 576·40 | P. E. Island.... | 508·38 | 965 84 |
| 34,716·97 | ..... .... | ............ | 246,348·02 | 281,064·99 | Manitoba....... | 232,003·75 | 440,515 74 |
| 8,040·61 | ..... .... | ............ | 26,631·55 | 34,672·16 | N.-W. Territ'y.. | 25,035·67 | 47,574 44 |
| 54,268·12 | ... .. . | ............ | 177,213·86 | 231,481·98 | B.Columbia..... | 145,371·30 | 276,247 65 |
| ............ | ........... | ... ....... | 10,327·45 | 10,327·45 | Yukon Territory | 4,448·84 | 8,452 63 |
| 8,612·54 | .......... | .. ........ | ...... .. | 8,612·54 | Sundries....... | .......... | ...... .. |
| 10,563,407·86 | 4,953,575·21<br>*5·96 | †115·54<br>228,479·76 | 2,840,423·02 | 18,586,007·35 | ....Totals...... | 3,207,748·12 | 6,158,275 22 |

* Surplus. † Seizure.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

Returns for the Years ended June 30, 1902 and 1903. CR.

| Removed in Bond. | | Free. | | Exported. | Used in Bonded Factories. | Remaining in Warehouse. | Totals. |
|---|---|---|---|---|---|---|---|
| To Other Divisions. | To Distillery for Re-distillation. | Legal Allowance. | Other | | | | |
| Galls. | Galls. | Galls. | Galls. | Galls. | Galls. | Galls. | Galls. |
| 2,449,140·42 | 469,392·27 | 157,159·01 | 7,623·16 | 148,926·85 | †66,039·58<br>214,758·13 | 10,038,804·52 | 14,876,208·96 |
| 130,927·23 | 25·11 | 639·06 | 189·84 | 180·51 | 139,853·07 | 399,258·52 | 1,828,185·53 |
| 1,243·55 | | | | 50·93 | 5,623·57 | 13,219·94 | 90,616·73 |
| 471·09 | | | | 131·76 | | 6,076.97 | 40,882·03 |
| | | | | | | 409·67 | 782·49 |
| 1,543·54 | | | | 102·39 | | 34,716·97 | 221,845·22 |
| | | | | | | 8,040·61 | 25,103·88 |
| 8,718·66 | | | | 2,406·54 | | 54,268·12 | 209,490·64 |
| | | | | | | 8,612·54 | 8,612·54 |
| 2,592,044·49 | 469,417·38 | 157,798·01 | 7,804·00 | 151,798·98 | 360 234·77<br>†66,039·58 | 10,563,407·86 | 17,301,728·02 |
| 2,671,741·29 | 870,230·91 | 229,519·86 | 7,556·57 | 154,193·81 | †68,444·23<br>272,806·58 | 10,052,905·88 | 15 763,081·62 |
| 149,677·51 | | 130·31 | 393·86 | 712·69 | 138,964·24 | 576,834·42 | 2,123,442·31 |
| 1,094·70 | | | | 9·49 | 6,859·77 | 10,728·23 | 95,297·98 |
| 682·66 | | | | 113·54 | | 5,291·10 | 37,449·92 |
| | | | | | | 68·02 | 576·40 |
| 1,987·36 | | | | 116·66 | | 46,957·22 | 281,064·99 |
| | | | | | | 9,636·49 | 34,672·16 |
| 15,239·50 | | | 175·86 | 2,520·18 | | 68,175·14 | 231,481·98 |
| | | | | | | 5,878·61 | 10,327·45 |
| | | | | | | 8,612·54 | 8,612·54 |
| 2,840,423·02 | 870,230·91 | 229,650·17 | 8,126·29 | 157,666·37 | 418,630·59<br>†68,444·23 | 10,785,087·65 | 18,586,007·35 |

† Used in the manufacture of Methylated Spirits at the Government Warehouse, Ottawa.

| | 1902 | 1903 |
|---|---|---|
| Total duty collected ex-manufactory and ex-warehouse... | $ 5,618,112 98 | $ 6,160,326 89 |
| " " on licenses | 2,500 00 | 2,500 00 |
| Totals | $ 5,620,612 98 | $ 6,162,826 89 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued.*—MALT.

### No. 6.—RETURN of Manufactures for the Year ended June 30, 1903.

| DIVISIONS. | LICENSES. | | Grain Placed in Steep. | Malt Manufactured. | Warehoused. | Total Duty collected ex-Manufactory, including License Fees. |
|---|---|---|---|---|---|---|
| | No. | Fees. | | | | |
| | | $ | Lbs. | Lbs. | Lbs. | $ cts. |
| Belleville, Ont | 1 | 50 | 369,635 | 289,270 | 289,270 | 50 00 |
| Brantford ″ | 2 | 100 | 797,023 | 639.780 | 639,780 | 100 00 |
| Guelph ″ | 8 | 900 | 9,665,067 | 7,672.823 | 7,672,823 | 900 00 |
| Hamilton ″ | 3 | 550 | 7,086,301 | 5,658 894 | 5,658,894 | 550 00 |
| Kingston ″ | 2 | 250 | 7,582,791 | 5,978,082 | 5,978,082 | 250 00 |
| London ″ | 3 | 450 | 5,741,247 | 4,521,162 | 4,521,162 | 450 00 |
| Ottawa ″ | 1 | 100 | 432,318 | 341,994 | 341,994 | 100 00 |
| Owen Sound ″ | 1 | 200 | 4,224,900 | 3,273,117 | 3.273,117 | 200 00 |
| Perth ″ | 2 | 100 | 334,069 | 270,690 | 270,690 | 100 00 |
| Peterborough, Ont | 2 | 250 | 2,795,382 | 2,187,068 | 2.187,068 | 250 00 |
| Prescott ″ | 4 | 275 | 2,136,558 | 1,673.244 | 1,673,244 | 275 00 |
| St. Catharines ″ | 2 | 100 | 909,363 | 729,544 | 729,544 | 100 00 |
| Stratford ″ | 1 | 200 | 8,261,900 | 6,558,140 | 6.558,140 | 200 00 |
| Toronto ″ | 10 | 1,400 | 13,258,451 | 10,318,688 | 10,318,688 | 1.400 00 |
| Windsor ″ | 1 | 200 | 2,554,350 | 2,082,240 | 2,082,240 | 200 00 |
| Totals | 43 | 5,125 | 66,149,355 | 52,194.736 | 52,194,736 | 5,125 00 |
| Montreal, Que | 3 | 600 | 12,136,880 | 9,718.508 | 9.718,508 | 600 00 |
| Quebec ″ | 1 | 150 | 1,330,738 | 1,058,693 | 1,058,693 | 150 00 |
| Totals | 4 | 750 | 13,467,618 | 10,777,201 | 10,777,201 | 750 00 |
| Halifax, N.S | 1 | 150 | 777.827 | 615.570 | 615,570 | 150 00 |
| Winnipeg, Man | 2 | 200 | 1,861,846 | 1,508,445 | 1,508,445 | 200 00 |
| Calgary, N.W.T. | 3 | 275 | 1.743,921 | 1,396,208 | 1,396,208 | 275 00 |
| Grand Totals | 53 | 6,500 | 84,000,567 | 66,492.160 | 66,492,160 | 6,500 00 |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A.—*Continued.*—MALT.

### No. 7.—Comparative Statement of Manufactures for the Years ended June 30, 1902 and 1903.

| Provinces. | Licenses. | | Grain Placed in Steep. | Malt Manufactured | Warehoused. | Total Duty collected ex-Manufactory, including License Fees. |
|---|---|---|---|---|---|---|
| | No. | Fees. | | | | |
| 1902. | | $ | Lbs. | Lbs. | Lbs. | $ cts. |
| Ontario ... .............. ..... | 40 | 4,850 | 72,664,880 | 57,383,000 | 57,383,000 | 4,850 00 |
| Quebec ...................... ... | 4 | 750 | 15,726,815 | 12,557,803 | 12,557,803 | 750 00 |
| Nova Scotia.. ... . .......... | 1 | 150 | 483,399 | 383,217 | 383,217 | 150 00 |
| Manitoba .. ..... ............. | 2 | 200 | 1,818,646 | 1,426,674 | 1,426,674 | 200 00 |
| N. W. Territories ............ | 2 | 250 | 1,430,963 | 1,119,911 | 1,119,911 | 250 00 |
| Totals .................. | 49 | 6,200 | 92,124,703 | 72,870,605 | 72,870,605 | 6,200 00 |
| 1903. | | | | | | |
| Ontario......................... | 43 | 5,125 | 66,149,355 | 52,194,736 | 52,194,736 | 5,125 00 |
| Quebec ....... ..... ..... | 4 | 750 | 13,467,618 | 10,777,201 | 10,777,201 | 750 00 |
| Nova Scotia. .... ........ .... | 1 | 150 | 777,827 | 615,570 | 615,570 | 150 00 |
| Manitoba ...................... | 2 | 200 | 1,861,846 | 1,508,445 | 1,508,445 | 200 00 |
| N. W. Territories ... .... ..... | 3 | 275 | 1,743,921 | 1,396,208 | 1,396,208 | 275 00 |
| Totals ......... ........ | 53 | 6,500 | 84,000,567 | 66,492,160 | 66,492,160 | 6,500 00 |

Inland Revenue Department,
Ottawa, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A.—*Continued*—MALT.

DR.

No. 8.—WAREHOUSE RETURN for

| Remaining in Warehouse from last Year. | Placed in Warehouse. | Increases. | Received from other Divisions. | Imported. | Totals. | DIVISIONS. |
|---|---|---|---|---|---|---|
| Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | |
| 4,226 | 289,270 | 760 | 50,400 | .......... | 344,656 | ....Belleville, Ont........ |
| 204,130 | 639,780 | 9,812 | 138,000 | ......... | 991,722 | ....Brantford " ........ |
| 2,431,031 | 7,672,823 | 94,729 | 593,200 | .... .. | 10,791,783 | ....Guelph " ........ |
| 1,967,792 | 5,658,894 | 57,202 | ....... .. | .......... | 7,683,888 | ....Hamilton " .. ..... |
| 4,233,850 | 5,978,082 | 95,424 | ...... ..... | . .. .... | 10,307,356 | ....Kingston " ........ |
| 2,372.382 | 4,521,162 | 42,321 | 188,084 | .... .. . | 7,123,949 | ....London " ........ |
| 53.400 | 341,994 | 1,270 | 300,000 | .... .... | 696,664 | ....Ottawa " .... ... |
| 1,937,297 | 3,273,117 | 28,624 | 632.300 | .......... | 5,871,338 | ....Owen Sound " ....... |
| 7,849 | 270,690 | 638 | ..... ...... | ......... | 279,177 | ....Perth " ....... |
| 394,419 | 2.187,068 | 50,230 | 43,760 | ......... | 2,675,477 | ....Peterborough " ........ |
| 16,270 | ..... . | ......... | 195,500 | ......... | 211,770 | ....Port Arthur " ........ |
| 403,766 | 1.673,244 | 21,357 | ............ | ... ... | 2,098,367 | ....Prescott " ........ |
| 120.106 | 729,544 | 4,530 | 296,800 | ......... | 1,150,980 | ....St. Catharines " ........ |
| 1,665,160 | 6,558,140 | 40,618 | 329,344 | .... .... | 8,593,262 | ....Stratford " ... .... |
| 7,105,694 | 10,318,688 | 109,998 | 3,373,464 | 341,500 | 21,249,344 | ....Toronto " ........ |
| 1,494.035 | 2,082,240 | 13,265 | 694,000 | 250 | 4,283,790 | ....Windsor " ........ |
| 24,411,407 | 52,194,736 | 570,778 | 6,834,852 | 341,750 | 84,553,523 | ..........Totals............. |
| 20,000 | .. .. .... | 11,415 | 1,247,865 | ..... .... | 1,279,280 | ....Joliette, Que ... .... |
| 4,233,771 | 9,718,508 | 116,327 | 3,262,000 | 8,160 | 17,338,766 | ....Montreal " ........ |
| 40,000 | 1,058,693 | .... .... | 2,713,472 | .......... | 3,812,165 | ....Quebec " .......... |
| 46,200 | ..... ..... | 2,200 | 1,436,000 | ..... .... | 1,484,400 | ....Sherbrooke " .... ..... |
| 4,339,971 | 10,777,201 | 129,942 | 8,659,337 | 8,160 | 23,914,611 | .........Totals.............. |
| 80,266 | . ...... | ...... .. | 1,432,000 | ......... | 1,512,266 | ..St. John, N.B........... |
| 93,217 | 615,570 | 3,359 | 2,292,000 | .......... | 3,004,146 | ....Halifax, N.S. . ... |
| 12,960 | ........... | ........ | 117,000 | ... ..... | 129,960 | ....Charlottetown, P.E.I..... |
| 493,801 | 1.508,445 | 25,513 | 1,020,000 | ......... | 3,047,759 | ....Winnipeg, Man....... . |
| 576,258 | 1.396,208 | 10,000 | ............ | 48,459 | 2,030,925 | ....Calgary, N.W.T ......... |
| 245,884 | ............ | ......... | 116,000 | 1.893,125 | 2,255,009 | ....Vancouver, B.C.......... |
| 3,165 | . .. ....... | ......... | 312,010 | 1,304,622 | 1,619,797 | ....Victoria " .. .. .... |
| 249,049 | ....... .... | . . .... | 428,010 | 3,197,747 | 3,874,806 | ......... Totals.. .... ..... |
| 30,256,929 | 66.492,160 | 739.592 | 20,783.199 | 3,596,116 | 121,867,996 | .... .....Grand Totals ...... |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

the Year ended June 30, 1903 Cr.

| Entered for Consumption at 1½ cts. per lb. | | | Removed to other Divisions. | Exported. | Free, and Written off. | Remaining in Warehouse. | Totals. |
|---|---|---|---|---|---|---|---|
| Lbs. | $ | cts. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| 312,514 | 4,687 | 71 | ...... | ...... | ...... | 32,142 | 344,656 |
| 753,730 | 11,305 | 94 | ...... | ...... | ...... | 237,992 | 991,722 |
| 4,691,726 | 70,375 | 89 | 2,545,216 | 80,000 | ...... | 3,474,841 | 10,791,783 |
| 4,558,624 | 68,379 | 36 | 1,105,800 | ...... | ...... | 2,019,464 | 7,683,888 |
| 2,242,058 | 33,630 | 87 | 4,979,336 | ...... | 16,100 | 3,069,862 | 10,307,356 |
| 4,555,270 | 68,329 | 91 | 80,000 | ...... | ...... | 2,488,679 | 7,123,949 |
| 597,230 | 8,958 | 45 | ...... | ...... | ...... | 99,434 | 696,664 |
| 1,304,078 | 19,561 | 17 | 2,997,734 | 40,000 | 7,150 | 1,522,376 | 5,871,338 |
| ...... | ...... | | ...... | ...... | 270,149 | 9,028 | 279,177 |
| 874,867 | 13,123 | 01 | 1,076,000 | 36,000 | ...... | 688,610 | 2,675,477 |
| 162,543 | 2,438 | 12 | ...... | ...... | ...... | 49,227 | 211,770 |
| 1,210,989 | 18,164 | 85 | 199,684 | ...... | ...... | 687,694 | 2,098,367 |
| 1,059,532 | 15,892 | 98 | ...... | ...... | ...... | 91,448 | 1,150,980 |
| 2,607,716 | 39,115 | 74 | 3,602,404 | ...... | ...... | 2,383,142 | 8,593,262 |
| 13,397,910 | 200,968 | 65 | 1,265,440 | 36,000 | ...... | 6,549,994 | 21,249,344 |
| 3,019,050 | 45,285 | 75 | 36,000 | ...... | 119,700 | 1,109,040 | 4,283,790 |
| 41,347,837 | 620,218 | 40 | 17,887,614 | 192,000 | 413,099 | 24,512,973 | 84,353,523 |
| ...... | ...... | | ...... | ...... | 1,245,725 | 33,555 | 1,279,280 |
| 9,696,474 | 145,447 | 11 | 2,281,575 | 42,480 | 76,566 | 5,241,671 | 17,338,766 |
| 3,675,093 | 55,126 | 27 | ...... | ...... | ...... | 137,072 | 3,812,165 |
| 1,363,800 | 20,457 | 00 | 40,000 | ...... | ...... | 80,600 | 1,484,400 |
| 14,735,367 | 221,030 | 38 | 2,321,575 | 42.480 | 1,322,291 | 5,492,898 | 23.914,611 |
| 1,370,170 | 20,552 | 55 | 80,000 | ...... | ...... | 62,096 | 1,512,266 |
| 2,705,552 | 40,583 | 28 | 54,000 | 52,560 | ...... | 192,034 | 3,004,146 |
| 93,960 | 1,409 | 40 | 36,000 | ...... | ...... | ...... | 129,960 |
| 2,506,378 | 37,595 | 67 | ...... | ...... | ...... | 541,381 | 3,047,759 |
| 1,144,481 | 17,167 | 28 | 396,010 | ...... | ...... | 490,434 | 2,030,925 |
| 2,132,625 | 31,989 | 48 | ...... | ...... | ...... | 122,384 | 2,255,009 |
| 1,571,787 | 23,576 | 56 | 8,000 | ...... | ...... | 40,010 | 1,619,797 |
| 3,704,412 | 55,566 | 04 | 8,000 | ...... | ...... | 162,394 | 3,874,806 |
| 67,608,157 | 1,014,123 | 00 | 20,783,199 | 287,040 | 1,735,390 | 31,454,210 | 121,867.996 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—MALT.

DR.

## No. 9.—COMPARATIVE STATEMENT of Warehouse Returns

| Remaining in Warehouse from last year. | Placed in Warehouse. | Increases. | Received from other Divisions. | Imported. | Totals. | PROVINCES. |
|---|---|---|---|---|---|---|
| Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | 1902. |
| 20,824,850 | 57,383,000 | 617,464 | 5,416,984 | 79,200 | 84,321,498 | ..Ontario............ ... |
| 4,533,731 | 12,557,803 | 166,963 | 8,385,327 | 8,234 | 25,652,058 | ..Quebec............... |
| 71,390 | ......... | ..... ...... | 1,290,000 | ............ | 1,361,390 | ..New Brunswick....... |
| 36,000 | 383,217 | 6,201 | 2,449,064 | .... ...... | 2,874,482 | ..Nova Scotia ...... . ... |
| 20,000 | ........ . | ............ | 256,000 | ............ | 276,000 | ..Prince Edward Island.. |
| 195,381 | 1,426,674 | 37,684 | 842,000 | 1,120 | 2,502,859 | ..Manitoba........ . . .. |
| 150,583 | 1,119,911 | 7,199 | 150,000 | 75,860 | 1,503,553 | ..N. W. Territories....... |
| 242,721 | ... ........ | ...... .... | 461,900 | 3,435,800 | 4,140,421 | ..British Columbia ..... |
| 26,074,656 | 72,870,605 | 835,511 | 19,251,275 | 3,600,214 | 122,632,261 | .... ...Totals.......... |
| | | | | | | 1903. |
| 24,411,407 | 52,194,736 | 570,778 | 6,834,852 | 341,750 | 84,353,523 | ..Ontario.. ........... |
| 4,339,971 | 10,777,201 | 129,942 | 8,659,337 | 8,160 | 23,914,611 | ..Quebec............... |
| 80,266 | ....... ... | .... . ..... | 1,432,000 | ......... ... | 1,512,266 | ..New Brunswick....... |
| 93,217 | 615,570 | 3,359 | 2,292,000 | .. ......... | 3,004,146 | .Nova Scotia ... ....... |
| 12,960 | ..... ..... | ..... ... | 117,000 | ............ | 129,960 | ..Prince Edward Island.. |
| 493,801 | 1,508,445 | 25,513 | 1,020,000 | ........... | 3,047,759 | ..Manitoba.... .. .. . |
| 576,258 | 1,396.208 | 10,000 | .... .. .. | 48,459 | 2,030,925 | ..N. W. Territories...... |
| 249,049 | ..... ..... | . . .... | 428,010 | 3,197,747 | 3.874,806 | ..British Columbia... .. |
| 30,256,929 | 66,492,160 | 739,592 | 20,783,199 | 3,596,116 | 121,867,996 | ........Totals..... .. |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

for the Years ended June 30, 1902 and 1903. Cr.

| Entered for Consumption at 1½ cents per lb. | | Removed to other Divisions. | Exported. | Free, and Written off. | Remaining in Warehouse. | Totals. |
|---|---|---|---|---|---|---|
| Lbs. | $ cts. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| 43,704,630 | 655,570 56 | 15,459,420 | 297,230 | 448,811 | 24,411,407 | 84,321,498 |
| 16,787,527 | 251,812 77 | 3,591,455 | 72,000 | 861,105 | 4,339,971 | 25,652,058 |
| 1,276,732 | 19,150 98 | ..... | ..... | 4,392 | 80,266 | 1,361,390 |
| 2,745,265 | 41,178 98 | 36,600 | ..... | ..... | 93,217 | 2,874,482 |
| 263,040 | 3,945 60 | ..... | ..... | ..... | 12,960 | 276,000 |
| 2,009,058 | 30,135 86 | ..... | ..... | ..... | 493,801 | 2,502,859 |
| 769,795 | 11,546 96 | 157,500 | ..... | ..... | 576,258 | 1,503,553 |
| 3,884,472 | 58,267 03 | 6,900 | ..... | ..... | 249,049 | 4,140,421 |
| 71,440,519 | 1,071,608 74 | 19,251,275 | 369,230 | 1,314,308 | 30,256,929 | 122,632,261 |
| | | | | | | |
| 41,347,837 | 620,218 40 | 17,887,614 | 192,000 | 413,099 | 24,512,973 | 84,353,523 |
| 14,735,367 | 221,030 38 | 2,321,575 | 42,480 | 1,322,291 | 5,492,898 | 23,914,611 |
| 1,370,170 | 20,552 55 | 80,000 | ..... | ..... | 62,096 | 1,512,266 |
| 2,705,552 | 40,583 28 | 54,000 | 52,560 | ..... | 192,034 | 3,004,146 |
| 93,960 | 1,409 40 | 36,000 | ..... | ..... | ..... | 129,960 |
| 2,506,378 | 37,595 67 | ..... | ..... | ..... | 541,381 | 3,047,759 |
| 1,144,481 | 17,167 28 | 396,010 | ..... | ..... | 490,434 | 2,030,925 |
| 3,704,412 | 55,566 04 | 8,000 | ..... | ..... | 162,394 | 3,874,806 |
| 67,608,157 | 1,014,123 00 | 20,783,199 | 287,040 | 1,735,390 | 31,454,210 | 121,867,996 |

| | 1902. | 1903. |
|---|---|---|
| Total duty collected, ex-manufactory and ex-warehouse ........ | $ 1,071,608 74 | $ 1,014,123 00 |
| " " " on licenses .................... | 6,200 00 | 6,500 00 |
| | $ 1,077,808 74 | $ 1,020,623 00 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A.—*Continued.*—MALT LIQUOR.

### No. 10.—Return of Manufactures for the Year ended June 30, 1903.

| Divisions. | Licenses. | | Malt used. | Other commodities used. | Malt Liquor manufactured. | Malt Liquor exported, and used by H. M. Army and Navy. | Total Duty collected, including License Fees. |
|---|---|---|---|---|---|---|---|
| | No. | Fees. | | | | | |
| | | $ | Lbs. | Lbs. | Galls. | Galls. | $ cts. |
| Belleville, Ont. | 1 | 50 | 145,914 | ........ | 66,410 | ............ | 50 00 |
| Brantford " | 3 | 150 | 754,576 | ........ | 309,395 | ............ | 150 00 |
| Guelph " | 9 | 450 | 4,368,567 | ........ | 1,881,350 | ............ | 450 00 |
| Hamilton " | 3 | 150 | 3,089,114 | ........ | 1,494,760 | ............ | 150 00 |
| Kingston " | 2 | 100 | 494,736 | ........ | 152,275 | ............ | 100 00 |
| London " | 6 | 300 | 4,933,642 | ........ | 1,907,704 | 1,177 | 300 00 |
| Ottawa " | 3 | 150 | 1,042,068 | ........ | 414,535 | ............ | 150 00 |
| Owen Sound " | 6 | 300 | 1,165,555 | ........ | 465,320 | ............ | 300 00 |
| Peterborough " | 3 | 150 | 873,664 | ........ | 292,315 | ............ | 150 00 |
| Port Arthur " | 1 | 50 | 163,560 | ........ | 73,445 | ............ | 50 00 |
| Prescott " | 2 | 100 | 936,012 | ........ | 317,235 | ............ | 100 00 |
| St. Catharines " | 2 | 100 | 1,061,900 | ........ | 401,750 | ............ | 100 00 |
| Stratford " | 5 | 250 | 511,744 | ........ | 245,300 | ............ | 250 00 |
| Toronto " | 13 | 650 | 12,862,342 | ........ | 5,401,731 | ............ | 650 00 |
| Windsor " | 3 | 150 | 1,658,389 | ........ | 791,702 | ............ | 150 00 |
| Totals | 62 | 3,100 | 34,061,783 | ........ | 14,215,227 | 1,177 | 3,100 00 |
| Joliette, Que. | 1 | 50 | 1,800 | ........ | 805 | ............ | 50 00 |
| Montreal " | 10 | 500 | 13,576,550 | ........ | 5,308,955 | 1,000 | 500 00 |
| Quebec " | 4 | 200 | 3,701,755 | ........ | 1,411,450 | ............ | 200 00 |
| Sherbrooke " | 1 | 50 | 1,369,200 | ........ | 586,500 | ............ | 50 00 |
| Totals | 16 | 800 | 18,649,305 | ........ | 7,307,710 | 1,000 | 800 00 |
| St. John, N.B. | 2 | 100 | 1,358,370 | ........ | 504,736 | .......... | 100 00 |
| Halifax, N.S. | 4 | 200 | 2,708,699 | ........ | 911,200 | 168,118 | 200 00 |
| Charlottetown, P.E.I. | 2 | 75 | 92,520 | ........ | 32,200 | ............ | 75 00 |
| Winnipeg, Man. | 6 | 275 | 2,492,130 | ........ | 965,403 | ........ | 275 00 |
| Calgary, N.W.T. | 5 | 225 | 1,082,854 | ........ | 404,365 | ............ | 225 00 |
| Vancouver, B.C. | 30 | 1,450 | 2,151,776 | 30,878 | 868,043 | ............ | 4,360 20 |
| Victoria, B.C. | 7 | 350 | 1,595,306 | ........ | 546,270 | 48,044 | 350 00 |
| Totals | 37 | 1,800 | 3,747,082 | 30,878 | 1,414,313 | 48,044 | 4,710 20 |
| Grand Totals | 134 | 6,575 | 64,192,743 | 30,878 | 25,755,154 | 218,339 | 9,485 20 |

Inland Revenue Department,
Ottawa, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

APPENDIX A—*Continued*—MALT LIQUOR.

## No. 11.—Comparative Statement of Manufactures for the Years ended June 30, 1902 and 1903.

| Provinces. | Licenses. | | Malt used. | Other commodities used. | Malt Liquor manufactured. | Malt Liquor exported, and used by H. M. Army and Navy. | Total Duty collected, including License Fees. |
|---|---|---|---|---|---|---|---|
| | No. | Fees. | | | | | |
| 1902. | | $ | Lbs. | Lbs. | Galls. | Galls. | $ cts. |
| Ontario.. . . ............ | 61 | 3,000 | 36,055,856 | . ..... | 14,961,140 | $1,833\frac{3}{5}$ | 3,000 00 |
| Quebec . .... ............ | 18 | 900 | 21,697,679 | ...... .. | 8,529,155 | ........... | 900 00 |
| New Brunswick............ | 2 | 100 | 1,486,932 | ........ | 555,475 | ...... . . | 100 00 |
| Nova Scotia.............. | 4 | 200 | 2,808,194 | ........ | 941,500 | $130,895\frac{1}{2}$ | 200 00 |
| Prince Edward Island..... | 1 | 50 | 263,004 | . ...... | 91,450 | ........... | 50 00 |
| Manitoba .. .... .... .... | 7 | 350 | 2,048,448 | ........ | 780,667 | ..... ..... | 350 00 |
| N. W. Territories..... .... | 4 | 200 | 739,725 | ........ | 276,840 | .. ..... ... | 200 00 |
| British Columbia. ......... | 36 | 1,800 | 3,933,779 | 5,356 | 1,487,540 | 49,981 | 2,169 70 |
| Totals. ........ ... | 133 | 6,600 | 69,033,617 | 5.356 | 27,623,767 | $182,710\frac{1}{10}$ | 6,969 70 |
| 1903. | | | | | | | |
| Ontario.. .......... ... .. | 62 | 3,100 | 34,061,783 | ....... | 14,215,227 | 1,177 | 3,100 00 |
| Quebec .. .... ......... .. | 16 | 800 | 18,649,305 | ........ | 7,307,710 | 1,000 | 800 00 |
| New Brunswick.... ..... | 2 | 100 | 1,358,370 | ........ | 504,736 | .... ....... | 100 00 |
| Nova Scotia .. .. . . . .. | 4 | 200 | 2,708,699 | .... ... | 911,200 | 168,118 | 200 00 |
| Prince Edward Island.. .... | 2 | 75 | 92,520 | ....... | 32,200 | . ....... ... | 75 00 |
| Manitoba.... ............ | 6 | 275 | 2,492,130 | ........ | 965,403 | ......... . | 275 00 |
| N. W. Territories ... ..... | 5 | 225 | 1,082,854 | ...... | 404,365 | ...... ..... | 225 00 |
| British Columbia .......... | 37 | 1,800 | 3,747,082 | 30,878 | 1,414,313 | 48.044 | 4.710 20 |
| Totals......... ... | 134 | 6.575 | 64,192,743 | 30,878 | 25,755,154 | 218,339 | 9,485 20 |

| | 1902. | 1903. |
|---|---|---|
| | Galls. | Galls. |
| Exported . ....... ....... . ......... .......... .. . ............... | $2,148\frac{3}{5}$ | 2,457 |
| Used by H. M. Army and Navy.. . ..... .. ..... .. . .......... | $180,561\frac{1}{2}$ | 215,882 |
| Totals....... ...... .... ..... ... ......... ...... | $182,710\frac{1}{10}$ | 218,339 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

APPENDIX A.—*Continued*—TOBACCO.

No. 12. RETURN of Manufactures for the Year ended June 30, 1903.

| DIVISIONS. | LICENSES. | | Total weight of Raw Leaf Tobacco and other materials actually used. | TOBACCO | | | CIGARETTES. | | | CANADIAN TOBACCO. | | | COMBINATION TOBACCO. | | | COMBINATION CIGARETTES. | | | SNUFF | | | | [illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No | Fees. | | At 25 cents per lb. | Paid Duty. | Warehoused. | At $3 per M. | Paid Duty. | Warehoused | At 5 cents per lb. | Paid Duty. | Warehoused. | At 5 cents per lb. | Paid Duty. | Warehoused | At $1.50 per M. | Paid Duty. | Warehoused. | At 25 cents per lb. | Paid Duty. | At 18 cents per lb. | Paid Duty. | |
| | | $ cts | Lbs. | Lbs. | Lbs. | Lbs. | No. | No. | No. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | No. | No. | No. | Lbs. | Lbs. | Lbs. | Lbs. | $ cts |
| Hamilton, Ont | 1 | 75 00 | 1,221,796 | 1,215,923½ | 198,916 | 1,017,007½ | 11,214,800 | 11,212,800 | 2,000 | | | | | | | | | | | | | | [illegible] |
| Toronto, " | 3 | 477 50 | 272,787 | 2,883 | 2,883 | | 44,500 | 44,500 | | | | | 268,502 | 141,323 | 127,179 | | | | | | | | [illegible] |
| Windsor, " | 3 | 150 00 | 398,949 | | | | | | | 412,527 | 335,388<br>†9,513 | 67,626 | | | | | | | | | | | [illegible] |
| Totals | 7 | 402 50 | 1,893,532 | 1,218,806½ | 201,799 | 1,017,007½ | 11,259,300 | 11,257,300 | 2,000 | 412,527 | 335,388<br>†9,513 | 67,626 | 268,502 | 141,323 | 127,179 | | | | | | | | [illegible] |
| Joliette, Que | 1 | 50 00 | 44,718 | | | | | | | 47,488 | 47,488 | | | | | | | | | | | | [illegible] |
| Montreal, " | 22 | 1,407 50 | 7,093,699 | 6,177,505¾ | 331,646½ | 5,845,859¼ | 153,949,740<br>*511,500 | 151,975,740<br>509,500 | 1,974,000<br>2,000 | 548,005½ | 534,653½ | 13,352 | 293,536 | 166,804½ | 126,731½ | 476,081 | 122,000 | 354,081 | 5,721 | 5,721 | 99,425 | 99,425 | [illegible] |
| Quebec, " | 10 | 572 50 | 701,043½ | 85,171 | 85,171 | | 6,143,200 | 5,910,700 | 232,500 | 464,968¼ | 440,683¼ | 24,285 | 126,962 | 101,294 | 25,668 | | | | 1,206 | 1,206 | 64,270 | 64,270 | [illegible] |
| St. Hyacinthe, Que. | 3 | 150 00 | 3,953 | | | | | | | 3,953 | 3,953 | | | | | | | | | | | | [illegible] |
| Sherbrooke, " | 2 | 115 00 | 2,668,137 | | | | | | | 1,666,359½ | 1,666,359½ | | 1,073,458 | 599,972 | 473,486 | | | | | | | | [illegible] |
| Three Rivers, " | 1 | 50 00 | 4,718 | | | | | | | 5,459 | 5,459 | | | | | | | | | | | | [illegible] |
| Totals | 39 | 2,345 00 | 10,516,268½ | 6,262,676¾ | 416,817½ | 5,845,859¼ | 160,092,940<br>*511,500 | 157,886,440<br>509,500 | 2,206,500<br>2,000 | 2,736,233¼ | 2,698,596¼ | 37,637 | 1,493,956 | 868,070½ | 625,885½ | 476,081 | 122,000 | 354,081 | 6,927 | 6,927 | 163,695 | 163,695 | [illegible] |
| St. John, N.B | 1 | 75 00 | 22,149 | 4,549 | 4,090<br>‡333 | 126 | 6,391,210 | 5,836,000<br>‡190,000 | 368,210 | | | | | | | | | | | | | | [illegible] |
| Pictou, N.S | 2 | 125 00 | 78,586 | 69,022 | 5,786 | 63,236 | | | | 15,292½ | 13,787½ | 1,505 | | | | | | | | | | | [illegible] |
| Charlottetown, P.E.I | 4 | 265 00 | 178,240 | 171,262 | 48,003<br>†1,164 | 122,095 | | | | 1,154 | 1,154 | | 10,516 | 2,540 | 7,976 | | | | | | | | [illegible] |
| Grand Totals | 53 | 3,212 50 | 12,688,775½ | 7,726,316¼ | 676,495½<br>‡333<br>†1,164 | 7,048,323¾ | 177,746,450<br>*511,500 | 174,979,740<br>‡190,000<br>509,500 | 2,576,710<br>2,000 | 3,165,207 | 3,048,926<br>†9,513 | 106,768 | 1,772,974 | 1,011,933½ | 761,040½ | 476,081 | 122,000 | 354,081 | 6,927 | 6,927 | 163,695 | 163,695 | [illegible] |

* Cigarettes at $8 per M. † Credited on account of fires.

| | Tobacco. | Cigarettes. |
|---|---|---|
| ‡ Damaged by fire and subsequently reworked | 168 | 105,000 |
| Destroyed by fire and written off | 165 | 85,000 |
| | 333 | 190,000 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

APPENDIX A.—*Continued*—TOBACCO.

## No. 13.—Comparative Statement of Manufactures for the Years ended June 30, 1902 and 1903.

| Provinces. | Licenses. |  | Total weight of Raw Leaf Tobacco and other materials actually used. | Tobacco. |  |  | Cigarettes. |  |  | Canadian Tobacco. |  |  | Combination Tobacco. |  |  | Combination Cigarettes. |  |  | Snuff. |  |  |  | Total [illegible] Fees. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | No. | Fees. |  | At 25c. per lb. | Paid Duty. | Warehoused. | At $3 per M. | Paid Duty. | Warehoused. | At 5c. per lb. | Paid Duty. | Warehoused. | At 5c. per lb. | Paid Duty. | Warehoused. | At $1.50 per M. | Paid Duty. | Warehoused. | At 25c. per lb. | Paid Duty. | At 1[illegible] per lb. | Paid Duty. |  |
| 1902. |  | $ cts. | Lbs. | Lbs. | Lbs. | Lbs. | No. | No. | No. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | No. | No. | No. | Lbs. | Lbs. | Lbs. | Lbs. | $ cts. |
| Ontario | 7 | 377 50 | 1,602,586 | 963,640½ | 155,664 | 807,976½ | 9,620,684 | 9,570,684 | 50,000 | 419,719 | 375,749 | 43,970 | 198,091 | 60,393 | 137,698 |  |  |  |  |  |  |  | [illegible] |
| Quebec | 34 | 2,027 50 | 9,646,975¾ | 6,058,045½ | 444,353½ | 5,613,692 | 121,753,700<br>*52,550 | 118,218,850<br>52,550 | 3,534,850 | 2,475,180 | 2,339,883 | 135,297 | 1,094,479 | 648,341 | 446,138 | 982,000 | 982,000 |  | 6,598 | 6,598 | [illegible] | [illegible] | [illegible] |
| New Brunswick | 1 | 75 00 | 18,051 | 3,062 | 2,788 | 274 | 5,858,000 | 3,121,500 | 2,736,500 |  |  |  |  |  |  |  |  |  |  |  |  |  | [illegible] |
| Nova Scotia | 2 | 125 00 | 95,350½ | 79,626 | 6,006 | 73,620 |  |  |  | 19,549 | 15,419 | 4,130 |  |  |  |  |  |  |  |  |  |  | [illegible] |
| P. E. Island | 3 | 215 00 | 151,522 | 146,298 | 57,885 | 88,413 |  |  |  |  |  |  | 8,788 | 4,422 | 4,366 |  |  |  |  |  |  |  | 14,[illegible] |
| Totals | 47 | 2,820 00 | 11,514,485¼ | 7,250,672 | 666,696½ | 6,583,975½ | 137,232,384<br>*52,550 | 130,911,034<br>52,550 | 6,321,350 | 2,914,448 | 2,731,051 | 183,397 | 1,301,358 | 713,156 | 588,202 | 982,000 | 982,000 |  | 6,598 | 6,598 | [illegible] | [illegible] | [illegible] |
| 1903. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ontario | 7 | 402 50 | 1,893,532 | 1,218,806½ | 201,799 | 1,017,007½ | 11,259,300 | 11,257,300 | 2,000 | 412,527 | 335,388<br>†1,513 | 67,626 | 268,502 | 141,323 | 127,179 |  |  |  |  |  |  |  | [illegible] |
| Quebec | 39 | 2,345 00 | 10,516,268½ | 6,262,676¾ | 416,817½ | 5,845,859¼ | 160,092,940<br>*511,500 | 157,886,410<br>509,500 | 2,206,500<br>2,000 | 2,736,233½ | 2,698,596½ | 37,637 | 1,493,956 | 868,070½ | 625,885½ | 476,081 | 122,000 | 354,081 | 6,927 | 6,927 | 163,695 | 163,[illegible] | [illegible] |
| New Brunswick | 1 | 75 00 | 22,149 | 4,549 | 4,090<br>‡333 | 126 | 6,394,210 | 5,836,000<br>‡190,000 | 368,210 |  |  |  |  |  |  |  |  |  |  |  |  |  | [illegible] |
| Nova Scotia | 2 | 125 00 | 78,586 | 69,022 | 5,786 | 63,236 |  |  |  | 15,292½ | 13,787½ | 1,505 |  |  |  |  |  |  |  |  |  |  | [illegible] |
| P. E. Island | 4 | 265 00 | 178,240 | 171,262 | 48,003<br>†1,164 | 122,095 |  |  |  | 1,154 | 1,154 |  | 10,516 | 2,540 | 7,976 |  |  |  |  |  |  |  | 12,45[illegible] |
| Totals | 53 | 3,212 50 | 12,688,775½ | 7,726,316¼ | 676,495½<br>‡333<br>†1,164 | 7,048,323¾ | 177,746,450<br>*511,500 | 174,979,740<br>‡190,000<br>509,500 | 2,576,710<br>2,000 | 3,165,207 | 3,048,926<br>†9,513 | 106,768 | 1,772,974 | 1,011,933½ | 761,040½ | 476,081 | 122,000 | 354,081 | 6,927 | 6,927 | 163,695 | 163,695 | 90[illegible],774 [illegible] |

*Cigarettes at $8 per M. † Credited on account of fires.

|  | Tobacco. | Cigarettes. |
|---|---|---|
| ‡ Damaged by fire and subsequently reworked | 168 | 105,000 |
| Destroyed by fire and written off | 165 | 85,000 |
|  | 333 | 190,000 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

APPENDIX A.—*Continued*—TOBACCO.

Dr.

## No. 14.—Warehouse Return for the Year ended June

| Remaining in Warehouse. | | | | Placed in Warehouse. | | | | | Received from other Divisions. | | Totals to be Accounted for. | | | | | Divisions. | Entered for Consumption. | | | | | | [illegible] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Combination Cigarettes. | Tobacco. | Cigarettes. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Combination Cigarettes. | | Tobacco at 25c. per lb. | Cigarettes at $3 per M. | Canadian Tobacco at 5c. per lb. | Combination Tobacco at 5c. per lb. | Combination Cigarettes at $1.50 per M. | Duty | Tobacco. | Cigarettes. |
| Lbs. | No. | Lbs. | Lbs. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs. | No. | Lbs. | No. | Lbs. | Lbs. | No. | | Lbs. | No. | Lbs. | Lbs. | No. | $ cts. | Lbs. | No. |
| 542 | | | | | | | | | 10,521 | | 11,063 | | | | | Belleville, Ont. | 9,562 | | | | | 2,390 50 | | |
| 188 | | | | | | | | | 29,252½ | | 29,440½ | | | | | Guelph " | 28,322 | | | | | 7,080 51 | | |
| 200,234½ | | | | 1,017,007½ | 2,000 | | | | 425,687½ | | 1,642,929½ | 2,000 | | | | Hamilton " | 766,663 | | | | | 191,665 76 | 589,251½ | |
| 2,185 | | | | | | | | | 49,102 | | 51,287 | | | | | Kingston " | 49,110 | | | | | 12,277 50 | | |
| 5,097 | | | | | | | | | 74,724 | | 79,821 | | | | | London " | 73,193 | | | | | 18,298 26 | | |
| 13,952½ | | | | | | | | | 153,327 | | 167,279½ | | | | | Ottawa " | 156,837½ | | | | | 39,209 39 | | |
| 7,330 | | | | | | | | | 160,089 | | 167,419 | | | | | Owen Sound " | 156,398 | | | | | 39,099 52 | | |
| 3,418 | | | | | | | | | 47,748 | | 51,166 | | | | | Perth " | 49,344 | | | | | 12,336 00 | | |
| 682 | | | | | | | | | 16,325 | | 17,007 | | | | | Port Arthur " | 16,366 | | | | | 4,091 50 | | |
| 353 | | | | | | | | | 1,028 | | 1,381 | | | | | St. Catharines " | 1,381 | | | | | 345 25 | | |
| | | | | | | | | | 17,300 | | 17,300 | | | | | Stratford " | 15,890 | | | | | 3,972 54 | | |
| 32,664 | | | 16,007½ | | | | 127,179 | | 616,060½ | | 648,724½ | | | 143,186½ | | Toronto " | 637,984½ | | | 121,597½ | | 165,576 04 | | |
| | | 12,600 | | | | 67,626 | | | | | | | 80,226 | | | Windsor " | | | 60,290 | | | 3,014 50 | | |
| 266,646 | | 12,600 | 16,007½ | 1,017,007½ | 2,000 | 67,626 | 127,179 | | 1,601,164½ | | 2,884,818 | 2,000 | 80,226 | 143,186½ | | Totals | 1,961,051 | | 60,290 | 121,597½ | | 499,357 27 | 589,251½ | |
| 525,788½ | 145,000 | 2,830 | 13,259½ | 5,845,859¼ | 1,976,000 | 13,352 | 126,731½ | 354,081 | 50 | 105,000 | 6,371,697¾ | 2,226,000 | 16,182 | 139,991 | 354,081 | Montreal, Que. | 2,498,661 | 199,500 | 15,840 | 116,432 | 217,000 | 632,202 92 | 3,214,672½ | 1,535,000 |
| 5,655½ | 168,000 | 20,920 | 13,014½ | | 232,500 | 24,285 | 25,668 | | 20,782 | | 26,437½ | 400,500 | 45,205 | 38,682½ | | Quebec " | 24,797½ | 400,500 | 21,492 | 24,828 | | 9,716 84 | | |
| | | 4,390½ | 84,240 | | | | 473,486 | | | | | | 4,390½ | 557,726 | | Sherbrooke " | | | 4,390½ | 492,293 | | 24,834 17 | | |
| 531,444 | 313,000 | 28,140½ | 110,514 | 5,845,859¼ | 2,208,500 | 37,637 | 625,885½ | 354,081 | 20,832 | 105,000 | 6,398,135¼ | 2,626,500 | 65,777½ | 736,399½ | 354,081 | Totals | 2,523,458½ | 600,000 | 41,722½ | 633,553 | 217,000 | 666,753 93 | 3,214,672½ | 1,535,000 |
| 17,495½ | 295,400 | | | 126 | 368,210 | | | | 323,188 | | 340,809½ | 663,610 | | | | St. John, N.B. | 324,354½ | 7,000 | | | | 81,109 62 | | |
| 26,911 | 145,000 | | | | | | | | 400,373½ | 1,535,000 | 427,284½ | 1,680,000 | | | | Halifax, N.S. | 368,937½ | | | | | 92,234 51 | 50 | 105,000 |
| 6,975 | | 786 | | 63,236 | | 1,505 | | | 73,661 | | 143,872 | | 2,291 | | | Pictou, " | 70,206 | | 786 | | | 17,590 80 | | |
| 33,886 | 145,000 | 786 | | 63,236 | | 1,505 | | | 474,034½ | 1,535,000 | 571,156½ | 1,680,000 | 2,291 | | | Totals | 439,143½ | | 786 | | | 109,825 31 | 50 | 105,000 |
| 10,930 | | 1,026 | 546 | 122,095 | | | 7,976 | | | | 132,125 | | 1,026 | 8,522 | | Charlottetown, P.E.I. | 112,964 | | | 3,683 | | 28,425 15 | 219 | |
| 61,944 | | | | | | | | | 974,068 | | 1,036,012 | | | | | Winnigeg, Man. | 944,878 | | | | | 236,219 49 | | |
| 4,530 | | | | | | | | | 25,480 | | 30,010 | | | | | Calgary, N.W.T. | 23,436 | | | | | 5,859 00 | | |
| 39,688 | | | | | | | | | 257,155 | | 296,843 | | | | | Vancouver, B.C. | 237,566 | | | | | 59,391 50 | 7,582 | |
| 19,606 | | | | | | | | | 127,950 | | 147,556 | | | | | Victoria " | 117,878 | | | | | 29,469 57 | 3,711 | |
| 59,294 | | | | | | | | | 385,105 | | 444,399 | | | | | Totals | 355,444 | | | | | 88,861 07 | 11,293 | |
| | | | | | | | | | 11,614 | | 11,614 | | | | | Dawson, Yukon Ter. | 350 | | | | | 87 50 | | |
| 19,719½ | | | | | | | | | | | 19,719½ | | | | | Sundries | | | | | | | | |
| 1,004,989 | 753,400 | 42,552½ | 127,067½ | 7,048,323¾ | 2,578,710 | 106,768 | 761,040½ | 354,081 | 3,815,486 | 1,640,000 | 11,868,798¾ | 4,972,110 | 149,320½ | 888,108 | 354,081 | Grand Totals | 6,685,079½ | 607,000 | 102,798½ | 758,833½ | 217,000 | 1,716,498 34 | 3,815,486 | 1,640,000 |

Inland Revenue Department,
Ottawa, August 18, 1903.

Return for the Year ended June 30, 1903.

Cr.

| | Removed in Bond to other Divisions. | | Exported. | | | | Army and Navy, and Ships' Stores. | | | Written off. | | | Taken for Re-working. | | | | Remaining in Warehouse. | | | | | Totals Accounted for. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Duty. | Tobacco. | Cigarettes. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Tobacco. | Cigarettes. | Combination Tobacco. | Tobacco. | Cigarettes. | Combination Tobacco. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Combination Cigarettes. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Combination Cigarettes. |
| $ cts. | Lbs. | No. | Lbs. | No. | Lbs. | Lbs. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs | Lbs. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs. | No. | Lbs. | Lbs. | No. |
| 2,390 50 | | | | | | | | | | | | | | | | | 1,501 | | | | | 11,063 | | | | |
| 7,080 51 | | | | | | | | | | | | | | | | | 1,118½ | | | | | 29,440½ | | | | |
| 191,665 76 | 589,261½ | | 58,738 | 2,000 | | | 25 | | | | | | 16 | | | | 228,226 | | | | | 1,642,929½ | 2,000 | | | |
| 12,277 50 | | | | | | | | | | | | | | | | | [illegible]177 | | | | | 51,287 | | | | |
| 18,298 26 | | | | | | | | | | | | | | | | | [illegible]8 | | | | | 79,821 | | | | |
| 39,209 39 | | | | | | | | | | | | | | | | | 10,[illegible]42 | | | | | 167,279½ | | | | |
| 39,099 52 | | | | | | | | | | | | | | | | | 11,021 | | | | | 167,419 | | | | |
| 12,336 00 | | | | | | | | | | | | | | | | | 1,822 | | | | | 51,166 | | | | |
| 4,091 50 | | | | | | | | | | | | | | | | | 641 | | | | | 17,007 | | | | |
| 345 25 | | | | | | | | | | | | | | | | | | | | | | 1,381 | | | | |
| 3,972 54 | | | | | | | | | | | | | | | | | 1,410 | | | | | 17,300 | | | | |
| 165,576 04 | | | | | | | | | | | | | | | | 168 | 10,740 | | | 21,421 | | 648,724½ | | | 143,186½ | |
| 3,014 50 | | | | | | | | | | | | | | | | | | | 19,936 | | | | | 80,226 | | |
| 499,357 27 | 589,261½ | | 58,738 | 2,000 | | | 25 | | | | | | 16 | | | 168 | 275,726½ | | 19,936 | 21,421 | | 2,884,818 | 2,000 | 80,226 | 143,186½ | |
| 632,202 92 | 3,214,672½ | 1,535,000 | 20,899¾ | 376,500 | 20 | | | | | 2,995 | | 310 | 4,713 | 57,000 | 322 | 384 | 629,756½ | 58,000 | | 22,865 | 137,081 | 6,371,697¾ | 2,226,000 | 16,182 | 139,991 | 354,081 |
| 9,716 84 | | | | | | 360 | | | | | | | | | 1,842 | | 1,640 | | 21,871 | 13,494½ | | 26,437¼ | 400,500 | 45,205 | 38,682½ | |
| 24,834 17 | | | | | | | | | 180 | | | | | | | 11,730 | | | | 53,523 | | | | 4,390½ | 557,726 | |
| [illegible].753 93 | 3,214,672½ | 1,535,000 | 20,899¾ | 376,500 | 20 | 360 | | | 180 | 2,995 | | 310 | 4,713 | 57,000 | 2,164 | 12,114 | 631,396½ | 58,000 | 21,871 | 89,882½ | 137,081 | 6,398,135¼ | 2,626,500 | 65,777½ | 736,399½ | 354,081 |
| 81,109 62 | | | 126 | 368,210 | | | 73 | | | 1,567 | 141,900 | | | | | | 14,689 | 146,500 | | | | 340,809½ | 663,610 | | | |
| 92,234 51 | 50 | 105,000 | 3,785½ | | | | 28,344½ | 1,425,000 | | | | | | | | | 26,167 | 150,000 | | | | 427,284½ | 1,680,000 | | | |
| 17,590 80 | | | 55,040 | | | | | | | | | | | | | | 18,626 | | 1,505 | | | 143,872 | | 2,291 | | |
| 109,825 31 | 50 | 105,000 | 58,825½ | | | | 28,344½ | 1,425,000 | | | | | | | | | 44,793 | 150,000 | 1,505 | | | 571,156½ | 1,680,000 | 2,291 | | |
| [illegible],425 15 | 210 | | | | | | | | | 3,223 | | 70 | 940 | | 1,026 | 975 | 14,788 | | | 3,794 | | 132,125 | | 1,026 | 8,522 | |
| [illegible].219 49 | | | | | | | | | | | | | | | | | 91,134 | | | | | 1,036,012 | | | | |
| 5,859 00 | | | | | | | | | | | | | | | | | 6,574 | | | | | 30,010 | | | | |
| [illegible].391 50 | 7,582 | | | | | | 482 | | | 464 | | | | | | | 50,749 | | | | | 296,843 | | | | |
| 29,469 57 | 3,710 | | | | | | 3,622½ | | | | | | | | | | 22,345½ | | | | | 147,556 | | | | |
| [illegible],861 07 | 11,292 | | | | | | 4,104½ | | | 464 | | | | | | | 73,094½ | | | | | 444,399 | | | | |
| 87 50 | | | | | | | | | | | | | | | | | 11,264 | | | | | 11,614 | | | | |
| | | | | | | | | | | | | | | | | | 19,719½ | | | | | 19,719½ | | | | |
| 1,716,498 34 | 3,815,486 | 1,640,000 | 138,589¼ | 746,710 | 20 | 360 | 32,547 | 1,425,000 | 180 | 8,249 | 141,900 | 380 | 5,669 | 57,000 | 3,190 | 13,257 | 1,183,179 | 354,500 | 43,312 | 115,097½ | 137,081 | 11,868,798¾ | 4,972,110 | 149,320½ | 888,108 | 354,081 |

W. J. GERALD,
*Deputy Minister.*

APPENDIX A—*Continued*—TOBACCO.

DR.

No. 15.—COMPARATIVE STATEMENT of Warehouse Returns for the

| REMAINING IN WAREHOUSE. | | | | | PLACED IN WAREHOUSE. | | | | | RECEIVED FROM OTHER DIVISIONS. | | | | TOTALS TO BE ACCOUNTED FOR. | | | | | | | ENTERED FOR CONSUMPTION. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tobacco. | Cigarettes. | Canadian Tobacco. | Canadian Cigarettes. | Combination Tobacco. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Combination Cigarettes. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Tobacco. | Cigarettes. | Canadian Tobacco. | Canadian Cigarettes. | Combination Tobacco. | Combination Cigarettes. | PROVINCES. | Tobacco at 25c. per lb. | Cigarettes at $3 per M. | Canadian Tobacco at 5c. per lb. | Canadian Cigarettes at $1.50 per M. | Combination Tobacco at 5c per lb. | Combination Cigarettes at $1.50 per M. | Duty. | Tobacco |
| Lbs. | No. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs. | No. | Lbs. | Lbs. | Lbs. | No. | Lbs. | No. | Lbs. | No. | 1902. | Lbs. | No. | Lbs. | No. | Lbs. | No. | $ cts. | Lbs. |
| 287,955 | ...... | 18,520 | ...... | 9,780 | 807,976½ | 50,000 | 43,970 | 137,698 | ...... | 1,739,449½ | ...... | ...... | ...... | 2,835,381 | 50,000 | 62,490 | ...... | 147,478 | ...... | Ontario | 1,978,780½ | ...... | 47,436 | ...... | 130,966½ | | [illegible] | [illegible] |
| 588,504½ | 102,900 | 64,907½ | 975,000 | 104,626½ | 5,613,692 | 3,534,850 | 135,297 | 446,138 | ...... | 25,238½ | ...... | 28,620½ | 5,309 | 6,227,435 | 3,637,750 | 228,825 | 975,000 | 556,073½ | ...... | Quebec | 2,403,370½ | 1,091,450 | 151,047½ | 975,000 | 432,187½ | | [illegible] | [illegible] |
| 18,789½ | 519,400 | ...... | ...... | ...... | 274 | 2,736,500 | ...... | ...... | ...... | 328,409 | ...... | ...... | ...... | 347,472½ | 3,255,900 | ...... | ...... | ...... | ...... | New Brunswick | 329,571 | 224,000 | ...... | | | | [illegible] | |
| 43,201 | ...... | 2,923 | ...... | 1,150 | 73,620 | ...... | 4,130 | ...... | ...... | 454,865½ | 690,000 | ...... | ...... | 571,686½ | 690,000 | 7,053 | ...... | 1,150 | ...... | Nova Scotia | 445,891 | ...... | 1,983½ | ...... | 1,150 | | [illegible] | [illegible] |
| 5,874 | ...... | 1,551 | ...... | 2,826 | 88,413 | ...... | ...... | 4,366 | ...... | ...... | ...... | ...... | ...... | 94,287 | ...... | 1,551 | ...... | 7,192 | ...... | P. E. Island | 84,104 | ...... | 525 | ...... | 5,346 | | [illegible] | |
| 62,989 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 826,204 | ...... | ...... | ...... | 889,193 | ...... | ...... | ...... | ...... | ...... | Manitoba | 827,249 | ...... | ...... | ...... | ...... | | [illegible] | |
| 5,235 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 22,400 | ...... | ...... | ...... | 27,635 | ...... | ...... | ...... | ...... | ...... | N. W. Territories | 23,105 | ...... | ...... | ...... | | | [illegible] | |
| 54,661½ | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 361,670 | ...... | ...... | ...... | 416,331½ | ...... | ...... | ...... | ...... | ...... | British Columbia | 350,538½ | ...... | ...... | ...... | ...... | | [illegible] | [illegible] |
| 19,719½ | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 19,719½ | ...... | ...... | ...... | ...... | ...... | Sundries | ...... | ...... | ...... | ...... | ...... | ...... | | |
| 1,086,929 | 622,300 | 87,901½ | 975,000 | 118,382½ | 6,583,975½ | 6,321,350 | 183,397 | 588,202 | ...... | 3,758,236½ | 690,000 | 28,620½ | 5,309 | 11,429,141 | 7,633,650 | 290,919 | 975,000 | 711,893½ | ...... | Totals | 6,442,612½ | 1,315,450 | 200,992 | 975,000 | 569,650 | | [illegible] | [illegible] |
| | | | | | | | | | | | | | | | | | | | | 1903. | | | | | | | | |
| 266,646 | ...... | 12,600 | ...... | 16,007½ | 1,017,007⅓ | 2,000 | 67,626 | 127,179 | ...... | 1,601,164½ | ...... | ...... | ...... | 2,884,818 | 2,000 | 80,226 | ...... | 143,186½ | ...... | Ontario | 1,961,051 | ...... | 60,290 | ...... | 121,597½ | ...... | [illegible] | [illegible] |
| 531,444 | 313,000 | 28,140½ | ...... | 110,514 | 5,845,859¼ | 2,208,500 | 37,637 | 625,885½ | 354,081 | 20,832 | 105,000 | ...... | ...... | 6,398,135¼ | 2,626,500 | 65,777½ | ...... | 736,399½ | 354,081 | Quebec | 2,523,458½ | 600,000 | 41,722½ | | 633,553 | 217,000 | [illegible] | [illegible] |
| 17,495½ | 295,400 | ...... | ...... | ...... | 126 | 368,210 | ...... | ...... | ...... | 323,188 | ...... | ...... | ...... | 340,809½ | 663,610 | ...... | ...... | ...... | ...... | New Brunswick | 324,354½ | 7,000 | ...... | ...... | ...... | | [illegible] | |
| 33,886 | 145,000 | 786 | ...... | ...... | 63,236 | ...... | 1,505 | ...... | ...... | 474,034½ | 1,535,000 | ...... | ...... | 571,156½ | 1,680,000 | 2,291 | ...... | ...... | ...... | Nova Scotia | 439,143½ | ...... | 786 | ...... | | | [illegible] | [illegible] |
| 10,030 | ...... | 1,026 | ...... | 546 | 122,095 | ...... | ...... | 7,976 | ...... | ...... | ...... | ...... | ...... | 132,125 | ...... | 1,026 | ...... | 8,522 | ...... | P. E. Island | 112,964 | ...... | ...... | ...... | 3,683 | | [illegible] | [illegible] |
| 61,944 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 974,068 | ...... | ...... | ...... | 1,036,012 | ...... | ...... | ...... | ...... | ...... | Manitoba | 944,878 | ...... | ...... | ...... | | | [illegible] | |
| 4,530 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 25,480 | ...... | ...... | ...... | 30,010 | ...... | ...... | ...... | ...... | ...... | N. W. Territories | 23,436 | ...... | ...... | ...... | | ...... | [illegible] | |
| 59,294 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 385,105 | ...... | ...... | ...... | 444,399 | ...... | ...... | ...... | ...... | ...... | British Columbia | 355,444 | ...... | ...... | ...... | | | [illegible] | [illegible] |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 11,614 | ...... | ...... | ...... | 11,614 | ...... | ...... | ...... | ...... | ...... | Yukon Territory | 350 | ...... | ...... | ...... | ...... | ...... | [illegible] | |
| 19,719½ | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | 19,719½ | ...... | ...... | ...... | ...... | ...... | Sundries | ...... | ...... | ...... | ...... | ...... | ...... | | |
| 1,004,989 | 753,400 | 42,552½ | ...... | 127,067½ | 7,048,323¾ | 2,578,710 | 106,768 | 761,040½ | 354,081 | 3,815,486 | 1,640,000 | ...... | ...... | 11,868,798¾ | 4,972,110 | 149,320½ | ...... | 888,108 | 354,081 | Totals | 6,685,079½ | 607,000 | 102,798½ | ...... | 758,833½ | 217,000 | [illegible] | [illegible] |

Total duty collected, ex-manufactory and ex-warehouse,
Canada Twist and Raw Leaf.. ...
Total duty collected on licenses

Totals.. ..

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

### [illegible] Returns for the Years ended June 30, 1902 and 1903

| [illegible] | Duty. | Removed in Bond to other Divisions. | | | | Exported. | | | | Army and Navy, and Ships' Stores. | | | Written off | | | Taken for Re-working. | | | | Remaining in Warehouse | | | | | Totals Accounted for. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Tobacco. | Cigarettes. | Combination Tobacco. | Tobacco. | Cigarettes. | Combination Tobacco. | Tobacco. | Cigarettes. | Canadian Tobacco. | Combination Tobacco. | Tobacco. | [illegible] | Canadian Tobacco. | Combination Tobacco. | Combination Cigarettes. | Tobacco. | Cigarettes. | Canadian Tobacco. | Canadian Cigarettes. | Combination Tobacco. | Combination Cigarettes. |
| No. | $ cts. | Lbs. | No. | Lbs. | Lbs. | Lbs. | No. | Lbs. | Lbs. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs. | Lbs. | Lbs. | No. | Lbs. | Lbs. | No. | Lbs. | No. | Lbs. | No. | Lbs. | No. |
| | [illegible] 22 | 531,532½ | 50,000 | | | 54,890 | | | | 496 | | | 988½ | | | 2,047½ | | 2,454 | 504 | 266,646 | | 12,600 | 16,007½ | | 2,835,381 | 50,000 | 62,490 | | 147,47[illegible] | |
| | 634,741 42 | [illegible]224,859 | 640,000 | 28,620½ | 5,309 | 65,173 | 1,593,300 | 7,640 | 8 | 1,983½ | | | 109½ | | | 495½ | | 13,376½ | 8,055 | 531,144 | 31,000 | 28,140½ | 110,514 | | 6,227,435 | 3,637,750 | 228,82[illegible] | [illegible] | [illegible] | |
| | [illegible] 70 | | | | | 174 | 2,736,500 | | | 232 | | | | | | | | | | 17,495½ | 29,400 | | | | 347,472½ | 3,255,900 | | | | |
| | [illegible] 31 | 555 | | | | 79,278½ | | 2,202 | | 9,119 | 545,000 | | 54 | | | [illegible] | | 2,081½ | | 33,886 | 14,000 | 786 | | | 571,686½ | 690,000 | 7,053 | | [illegible] | |
| | 21,319 [illegible] | | | | | | | | | | | | | | | | | | 1,300 | 10,030 | | 1,026 | 546 | | 94,287 | | 1,551 | | [illegible] | |
| | [illegible] 24 | | | | | | | | | | | | | | | | | | | 61,944 | | | | | 889,193 | | | | | |
| | [illegible] | | | | | | | | | | | | | | | | | | | 4,530 | | | | | 27,635 | | | | | |
| | 87,634 64 | 1,290 | | | | | | | | 5,209 | | | | | | | | | | 59,294 | | | | | 416,331½ | | | | | |
| | | | | | | | | | | | | | | | | | | | | 19,719½ | | | | | 19,719½ | | | | | |
| | [illegible] 39 | 4,758,236½ | 690,000 | 28,620½ | 5,309 | 199,515½ | 4,329,800 | 9,842 | 8 | 17,039½ | 545,000 | | 1,152 | | | 5,596 | | 17,912 | 9,859 | 1,004,989 | 75,400 | 42,552½ | 127,067½ | | 11,429,141 | 7,633,650 | 299,919 | [illegible] | 711,[illegible] | |
| | [illegible] 27 | 589,261½ | | | | 58,738 | 2,000 | | | 25 | | | | | | 16 | | | 168 | 275,726½ | | 19,936 | 21,421 | | 2,884,818 | 2,000 | 80,226 | | 143,1[illegible] | |
| | [illegible] | 3,214,072½ | 1,535,000 | | | 20,899½ | 376,500 | 20 | 360 | | | 180 | 2,995 | | 310 | 4,713 | 57,000 | 2,164 | 12,114 | 631,396½ | [illegible] | 21,871 | 89,882½ | 137,081 | 6,398,135¼ | 2,626,500 | 65,777 | | [illegible] | [illegible] |
| | [illegible] 62 | | | | | 126 | 368,210 | | | 73 | | | 1,567 | 141,900 | | | | | | 14,689 | 14,500 | | | | 340,809½ | 663,610 | | | | |
| | [illegible] | 50 | 165,000 | | | 58,825½ | | | | 28,344½ | 1,425,000 | | | | | | | | | 44,793 | 15,000 | 1,505 | | | 571,156½ | 1,6[illegible],000 | 2,291 | | | |
| | [illegible] | 210 | | | | | | | | | | | 3,223 | | 70 | 940 | | 1,026 | 975 | 14,788 | | | 3,794 | | 132,125 | | 1,026 | | 8,722 | |
| | [illegible] | | | | | | | | | | | | | | | | | | | 91,134 | | | | | 1,036,012 | | | | | |
| | [illegible] | | | | | | | | | | | | | | | | | | | 6,574 | | | | | 30,010 | | | | | |
| | [illegible] 07 | 11,292 | | | | | | | | 4,104½ | | | 464 | | | | | | | 73,094½ | | | | | 444,399 | | | | | |
| | [illegible] | | | | | | | | | | | | | | | | | | | 11,264 | | | | | 11,614 | | | | | |
| | | | | | | | | | | | | | | | | | | | | 19,719½ | | | | | 19,719½ | | | | | |
| | [illegible] | [illegible] | 1,640,000 | | | 138,589½ | 746,710 | 20 | 360 | 32,547 | 1,425,000 | 180 | 8,249 | 141,900 | 380 | 5,669 | 57,000 | 3,190 | 13,257 | 1,183,179 | 35,[illegible] | 43,312 | 115,097½ | 137,081 | 11,868,798¾ | 4,972,110 | 149,32[illegible] | | [illegible] | [illegible] |

| | 1902. | 1903. |
|---|---|---|
| [illegible] | $ 3,560,634 41 | $ 3,901,292 14 |
| | 2,944 00 | 3,324 50 |
| | $ 3,563,578 41 | $ 3,904,616 64 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—RAW LEAF TOBACCO, INCLUDING STEMS, SCRAPS AND CUTTINGS.

DR. CR.

### No. 16.—WAREHOUSE RETURN for the Year ended June 30, 1903.

| Remaining in Warehouse from last Year. | Imported. | Placed in Warehouse ex-Factory. | Received from other Divisions. | Totals. | Divisions. | Entered for Consumption. Quantity. | Entered for Consumption. Duty. | Removed in Bond to other Divisions. | Exported. | Written off. | Taken for Horticultural purposes and destroyed. | Re-entered for Manufacture. | Remaining in Warehouse. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Std. lbs. | Std. lbs. | Std. lbs. | Std. lbs. | Std. lbs. | | Std. lbs. | $ cts. | Std. lbs. | Std. lbs. | Std. lbs. | Std. lbs. | Std. lbs. | Std. lbs. | Std. lbs. |
| 1,949 | 11,822 | ... | 3,995 | 17,766 | Belleville, Ont.. | 13,193 | 1,319 30 | ... | ... | ... | ... | 216 | 4,357 | 17,766 |
| 12,758 | 86,672 | 9,830 | 2,063 | 111,323 | Brantford " .. | 83,739 | 8,373 90 | 183 | 10,072 | ... | ... | 447 | 16,882 | 111,323 |
| 26,194 | 82,614 | 6,205 | 3,093 | 118,106 | Guelph " .. | 86,450 | 8,645 00 | 3,894 | 3,413 | ... | ... | 775 | 23,574 | 118,106 |
| 565,031 | 1,694,800½ | 251,610 | 7,080 | 2,518,521½ | Hamilton " .. | 1,634,612½ | 164,337 01 | 29,390 | 261,826 | ... | 70 | 4,210 | 588,413 | 2,518,521½ |
| 64,311 | 34,788 | 9,458 | 2,957¾ | 108,514¾ | Kingston " .. | 50,137¾ | 5,042 02 | 6,312 | 8,023 | 1,681 | ... | 1,754 | 40,607 | 108,514¾ |
| 184,884 | 625,367 | 91,058 | 42,688¾ | 943,997¾ | London " .. | 635,306 | 64,327 20 | 41,971 | 82,650 | ... | ... | 14,803 | 169,267¾ | 943,997¾ |
| 4,391 | 19,325 | ... | 5,024 | 28,740 | Ottawa " .. | 12,681 | 1,268 10 | 3,136 | ... | ... | 6,294 | ... | 6,629 | 28,740 |
| 1,778 | 13,667 | ... | 145 | 15,590 | Owen Sound " .. | 14,731 | 1,484 46 | ... | ... | . | ... | ... | 859 | 15,590 |
| 610½ | 2,213 | 107 | 658¼ | 3,588¾ | Perth " .. | 2,832¼ | 283 23 | 107 | ... | ... | ... | ... | 649½ | 3,588¾ |
| 1,044 | 1,680 | ... | 685 | 3,409 | Peterborough " .. | 1,382 | 138 20 | ... | ... | ... | 1,318 | ... | 709 | 3,409 |
| 3,634 | 9,199 | 1,764 | 420 | 15,017 | Prescott " .. | 9,901 | 1,017 42 | ... | 1,541 | ... | ... | 223 | 3,352 | 15,017 |
| 15,694 | 25,695 | 3,650 | 3,775 | 48,814 | St. Catharines " .. | 26,301 | 2,636 06 | 955 | 3,204 | ... | ... | 351 | 18,003 | 48,814 |
| 12,913 | 38,520 | 1,610 | ... | 53,043 | Stratford " .. | 32,204 | 3,220 40 | 1,172 | 1,610 | ... | ... | ... | 18,057 | 53,043 |
| 113,494½ | 402,193 | 62,696 | 9,719¾ | 588,103¼ | Toronto " .. | 395,620¼ | 49,164 87 | 23,756¾ | 32,027 | ... | 28 | 6,774 | 129,897¼ | 588,103¼ |
| 13,400 | 31,017 | 1,483 | 1,778 | 47,678 | Windsor " .. | 28,016 | 2,801 60 | 405 | 2,754 | ... | ... | 1,227 | 15,276 | 47,678 |
| 1,019,086 | 3,079,572½ | 439,471 | 84,082½ | 4,622,212 | ......Totals..... | 3,027,106¾ | 314,058 77 | 111,281¾ | 407,120 | 1,681 | 7,710 | 30,780 | 1,036,532½ | 4,622.212 |
| ... | ... | 594 | 1,538½ | 2.132½ | Joliette, Que.. | 1,238 | 261 88 | ... | ... | ... | ... | 408 | 486½ | 2,132½ |
| 4 259,354¼ | 7,798,000½ | 195,562½ | 121,095½ | 12,374,012¾ | Montreal " .. | 7,423,595¾ | 767,258 78 | 64,844¾ | 191,484¾ | 7,279 | 267 | 79,521¼ | 4,607,020¼ | 12,374,012¾ |
| 91 545 | 205,914¾ | 41,443 | 24,739¾ | 363,642½ | Quebec " .. | 217,344½ | 26,946 74 | 39,170½ | 11,676 | ... | ... | 22,595 | 72,856½ | 363,642½ |
| 16 452 | 27,444 | 3,088 | 575 | 47,559 | St. Hyacinthe " .. | 29,848 | 3,010 24 | 3,088 | ... | ... | ... | ... | 14,623 | 47,559 |
| 147,129½ | 339,141 | 16,616 | 8,297 | 511,183½ | Sherbrooke " .. | 349,616½ | 80,088 21 | 16,940 | 16,439 | ... | ... | 4,901 | 123,287 | 511,183½ |
| 3,368½ | 5,981 | ... | 1,204 | 10,553½ | Three Rivers " .. | 8,041½ | 946 39 | 403 | ... | ... | ... | ... | 2,109 | 10,553½ |
| 4,517,849¼ | 8,376,481¼ | 257,303½ | 157,449¾ | 13,309,083¾ | .. ..Totals.... | 8,029,684¼ | 878,512 24 | 124,446¼ | 219,599¾ | 7,279 | 267 | 107,425¼ | 4,820,382¼ | 13,309,083¾ |
| 31,866½ | 61,692½ | 2,816 | 2,115¼ | 98,490¼ | St. John, N.B.... | 48,386¾ | 5,698 45 | 886 | 2,816 | 7,801 | ... | ... | 38,600½ | 98,490¼ |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7,693½ | 13,732 | .... .... | 886 | 22,311½ | Halifax, N.S. . | 13,688 | 1,369 16 | ... ... | .... ... | .. | 1,130 | .. .. | 7,493½ | 22,311½ |
| 17,918 | 54,980 | .......... | .... . . | 72,898 | Pictou " ..... | 57,235 | 5,723 50 | .. .. | ... ....... | .. | 13 | ......... | 15,620 | 72,898 |
| 25,611½ | 68,712 | .......... | 886 | 95,209½ | .. ..Totals ... . | 70,923 | 7,092 66 | ........ | .... ... | .... | 1,173 | .... .. | 23,113½ | 95,209½ |
| 60,032 | 201,809 | ... ..... | . ..... .. | 261,841 | Charlottetown, P.E.I. | 160,315 | 16,168 94 | .. ..... | . . .... | 34,906 | .. . | ....... .. | 66,620 | 261,841 |
| 40,111½ | 153,080½ | 18,886 | 3,674 | 215,755 | Winnipeg, Man.. | 149,433½ | 14,943 35 | 8,646 | 8,668 | ..... | 119 | .......... | 48,888½ | 215,755 |
| 1,465 | 13,041 | 1,413 | 521½ | 16,440½ | Calgary, N.W.T.. | 11,505½ | 1,150 55 | 371 | ......... | ...... | ...... | ......... | 4,564 | 16,440½ |
| 35,798 | 92,123 | 13,634 | ........ | 141,555 | Vancouver, B.C. | 81,839½ | 8,229 79 | 3,746 | 12,099 | ...... | ...... | 285 | 43,585½ | 141,555 |
| 7,271 | 10,667 | 5,050 | 2,891 | 55,882 | Victoria " . | 36,769 | 3,714 12 | 2,246 | 3,499 | ...... | ..... | 67 | 13,301 | 55,882 |
| 43,069 | 132,790 | 18,684 | 2,891 | 197,437 | . ....Totals..... | 118,608½ | 11,911 21 | 5,992 | 15,598 | . | ..... | 352 | 56,886½ | 197,437 |
| 5,739,093¾ | 12,087,178¾ | 738,573½ | 251,623 | 18,816,469 | ...Grand Totals... | 11,615,963¼ | 1,249,569 17 | 251,623 | 653,801¾ | 51,667 | 9,239 | 138,557¼ | 6,095,587¾ | 18,816,469 |

W. J. GERALD,
*Deputy Minister*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## APPENDIX A—*Continued*—RAW LEAF TOBACCO, INCLUDING STEMS, SCRAPS AND CUTTINGS.

### No. 17.—COMPARATIVE STATEMENT of Warehouse Returns for the Years ended June 30, 1902 and 1903.

| Remaining in Warehouse from last year. | Imported. | Placed in Warehouse ex-Factory. | Received from other Divisions. | Totals. | PROVINCES. | ENTERED FOR CONSUMPTION. Quantity. | ENTERED FOR CONSUMPTION. Duty. | | Removed in bond to other Divisions. | Exported. | Written off. | Taken for Horticultural purposes and destroyed. | Re-entered for Manufacture. | Remaining in Warehouse. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Std. lbs. | Std. lbs. | Std. lbs. | Std. lbs. | Std. lbs. | 1902. | Std. lbs. | $ | cts. | Std. lbs. | Std. lbs. | S. lbs. | S. lbs. | Std. lbs. | Std. lbs. | Std. lbs. |
| 1,070,744 | 2,524,300½ | 328,032 | 57,151¼ | 3,980,227¾ | ..Ontario ...... | 2,578,490¾ | 265,676 | 24 | 56,042 | 288,494 | 21 | 11,580 | 26,514 | 1,019,086 | 3,980,227¾ |
| 4,411,646¼ | 7,785,972¾ | 301,847¼ | 171,564 | 12,671,030¼ | ..Quebec ...... | 7,610,380 | 818,579 | 27 | 164,079¾ | 193,441¾ | 125 | 4,353 | 180,801½ | 4,517,849¼ | 12,671,030¼ |
| 20,091½ | 64,848 | 3,778 | 2,582 | 91,299½ | ..New Brunswick .. | 53,160 | 6,220 | 16 | 1,132 | 4,228 | ...... | .. | 913 | 31,866½ | 91,299½ |
| 37,416 | 67,900 | ......... | 1,143 | 106,459 | ..Nova Scotia ..... | 80,617½ | 8,067 | 67 | ......... | ......... | ...... | 230 | ...... | 25,611½ | 106,459 |
| 64,755 | 133,662 | ......... | ......... | 198,417 | ..P. E. Island ...... | 138,385 | 14,032 | 90 | ...... | ......... | .... | ... | ........ | 60,032 | 198,417 |
| 54,996 | 104,038 | 12,369 | 138½ | 171,541½ | ..Manitoba ...... | 119,850 | 11,985 | 00 | 3,601 | 7,976 | ...... | ...... | ........ | 40,114½ | 171,541½ |
| 1,224 | 7,482 | 742 | 162 | 9,610 | ..N. W. Territories. | 7,403 | 740 | 30 | 742 | ......... | ...... | ...... | ........ | 1,465 | 9,610 |
| 42,652 | 116,824½ | 10,916 | 1,031 | 171,423½ | ..British Columbia.. | 116,675½ | 11,977 | 51 | 8,175 | 2,725 | ...... | ...... | 779 | 43,069 | 171,423½ |
| 5,703,524¾ | 10,805,027¾ | 657,684¼ | 233,771¾ | 17,400,008½ | ....Totals....... | 10,704,961¾ | 1,137,279 | 05 | 233,771¾ | 496,864¾ | 146 | 16,163 | 209,007½ | 5,739,093¾ | 17,400,008½ |
| | | | | | 1903. | | | | | | | | | | |
| 1,019,086 | 3,079,572½ | 439,471 | 84,082½ | 4,622,212 | ..Ontario ...... | 3,027,106¾ | 314,058 | 77 | 111,281¾ | 407,120 | 1,681 | 7,710 | 30,780 | 1,036,532½ | 4,622,212 |
| 4,517,849¼ | 8,376,481¼ | 257,303½ | 157,449¾ | 13,309,083¾ | ..Quebec ...... | 8,029,684¼ | 878,512 | 24 | 124,446¼ | 219,599¾ | 7,279 | 267 | 107,425¼ | 4,820,382¼ | 13,309,083¾ |
| 31,866½ | 61,692½ | 2,816 | 2,115¼ | 98,490¼ | ..New Brunswick .. | 48,386¾ | 5,698 | 45 | 886 | 2,816 | 7,801 | ...... | ........ | 38,600½ | 98,490¼ |
| 25,611½ | 68,712 | ......... | 886 | 95,209½ | ..Nova Scotia ...... | 70,923 | 7,092 | 66 | ......... | ...... | .... | 1,173 | ........ | 23,113½ | 95,209½ |
| 60,032 | 201,809 | ......... | ......... | 261,841 | .P. E. Island ...... | 160,315 | 16,168 | 94 | ......... | ......... | 34,906 | .... | ........ | 66,620 | 261,841 |
| 40,114½ | 153,080½ | 18,886 | 3,674 | 215,755 | ..Manitoba ........ | 149,433½ | 14,943 | 35 | 8,646 | 8,668 | .. | 119 | ........ | 48,888½ | 215,755 |
| 1,465 | 13,041 | 1,413 | 521½ | 16,440½ | ..N. W. Territories. | 11,505½ | 1,150 | 55 | 371 | ......... | ...... | ...... | ........ | 4,564 | 16,440½ |
| 43,069 | 132,790 | 18,684 | 2,894 | 197,437 | ..British Columbia.. | 118,608½ | 11,944 | 21 | 5,992 | 15,598 | ...... | ...... | 352 | 56,886½ | 197,437 |
| 5,739,093¾ | 12,087,178¾ | 738,573½ | 251,623 | 18,816,469 | ..... Totals........ | 11,615,963¼ | 1,249,569 | 17 | 251,623 | 653,801¾ | 51,667 | 9,269 | 138,557¼ | 6,095,587¾ | 18,816,469 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## APPENDIX A—*Continued*—CANADA TWIST TOBACCO.

No. 18.—STATEMENT of Revenue Collected from Canada Twist Tobacco for the Year ended June 30, 1903.

| Divisions. | Licenses. | | Canada Twist at 5 cts. per pound. | Total Duty Collected, including License Fees. |
|---|---|---|---|---|
| | No. | Fees. | | |
| | | $ | Lbs. | $ cts. |
| Cornwall, Ont. | 2 | 4 | 1,387 | 73 35 |
| Ottawa " | 5 | 10 | 1,741 | 97 05 |
| Prescott " | 1 | 2 | 260 | 15 00 |
| Totals | 8 | 16 | 3,388 | 185 40 |
| Joliette, Que. | 13 | 20 | 27,793 | 1,409 65 |
| Montreal " | 38 | 76 | 22,075 | 1,179 75 |
| Totals | 51 | 96 | 49,868 | 2,589 40 |
| Grand Totals | 59 | 112 | 53,256 | 2,774 80 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## CANADA TWIST TOBACCO.

No. 19.—COMPARATIVE STATEMENT for Years ended June 30, 1902 and 1903.

| Years. | Provinces. | Licenses. | | Canada Twist, at 5 cts. per pound. | Total Duty collected, including License Fees. |
|---|---|---|---|---|---|
| | | No. | Fees. | | |
| | | | $ | Lbs. | $ cts. |
| 1902 | Ontario | 15 | 29 | 4,280 | 243 00 |
| | Quebec | 53 | 95 | 68,006½ | 3,495 33 |
| | Totals | 68 | 124 | 72,286½ | 3,738 33 |
| 1903 | Ontario | 8 | 16 | 3,388 | 185 40 |
| | Quebec | 51 | 96 | 49,868 | 2,589 40 |
| | Totals | 59 | 112 | 53,256 | 2,774 80 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## APPENDIX A—*Continued*—CIGARS.

### No. 20.—RETURN of Manufactures

| DIVISIONS. | LICENSES. | | Total weight of Raw Leaf Tobacco and all other materials actually used. | Deficiencies paying duty. | CIGARS AT $7 PER THOUSAND. | | CIGARS |
|---|---|---|---|---|---|---|---|
| | No. | Fees. | | | Produced. | Paid Duty. | Produced. |
| | | $ cts. | Lbs. | No. | No. | No. | No. |
| Belleville, Ont | 1 | 75 00 | 12,485 | | | | 709,400 |
| Brantford " | 7 | 525 00 | 74,520 | | | | 4,048,015 |
| Guelph " | 12 | 900 00 | 82,165 | | | | 5,164,705 |
| Hamilton " | 14 | 1,050 00 | 194,998½ | 100 | | | 10,181,740 |
| Kingston " | 3 | 225 00 | 47,981¾ | | | | 2,689,725 |
| London " | 22 | 1,612 50 | 560,745 | | | | 32,935,010 |
| Ottawa " | 2 | 112 50 | 13,379 | | | | 676,100 |
| Owen Sound " | 3 | 225 00 | 14,554 | 4,211 | | | 761,820 |
| Perth " | 1 | 75 00 | 2,282¼ | 5,374 | | | 120,900 |
| Peterborough, Ont. | 1 | 75 00 | 1,263 | | | | 94,450 |
| Prescott " | 3 | 225 00 | 9,906 | | | | 631,000 |
| St. Catharines " | 10 | 750 00 | 23,413 | 150 | | | 1,387,725 |
| Stratford " | 3 | 225 00 | 29,104 | 600 | | | 1,627,725 |
| Toronto " | 27 | 2,025 00 | 291,039¼ | 4,290 | 501 | 501 | 16,144,745 |
| Windsor " | 6 | 450 00 | 26,789 | | 1,020 | 1,020 | 1,561,255 |
| Totals | 115 | 8,550 00 | 1,384,624¾ | 14.725 | 1,521 | 1.521 | 78,734,315 |
| Joliette, Que. | 4 | 202 50 | 48,134 | | | | 24,950 |
| Montreal " | 38 | 2,782 50 | 1,066,376¼ | 41,412 | 1,680 | 1,680 | 53,288,725 |
| Quebec " | 7 | 462 50 | 118,530 | | 7,614 | 7,614 | 6,271,910 |
| St. Hyacinthe, Que | 5 | 290 00 | 44,355 | | | | 1,698.220 |
| Sherbrooke " | 5 | 337 50 | 135.270½ | 23,695 | | | 7,374.265 |
| Three Rivers " | 3 | 215 00 | 13.125½ | | | | 381,510 |
| Totals | 62 | 4,290 00 | 1,425,791¼ | 65,107 | 9,294 | 9,294 | 69,039,580 |
| St. Johh, N.B | 7 | 495 00 | 66,431¾ | | | | 921.665 |
| Halifax, N.S. | 3 | 225 00 | 13,623 | | | | 754,105 |
| Winnipeg, Man | 9 | 675 00 | 131,551½ | | | | 7,139,550 |
| Calgary, N.W.T. | 2 | 150 00 | 9.939½ | | | | 480,885 |
| Vancouver, B.C. | 14 | 960 00 | 65,710½ | | 1,002 | 1,002 | 3,618,425 |
| Victoria " | 12 | 890 00 | 33,705 | *5,043 | | | 1.697,000 |
| Totals | 26 | 1,850 00 | 99,415½ | *5,043 | 1,002 | 1,002 | 5,315,425 |
| Grand Totals | 224 | 16,235 00 | 3,131,377¼ | 84,875 | 11,817 | 11,817 | 162,385,525 |

* Combination cigars at $3 per M.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

for the Year ended June 30, 1903.

| AT $6 PER THOUSAND. | | CANADIAN CIGARS AT $3 PER THOUSAND. | | | COMBINATION CIGARS AT $3 PER THOUSAND. | | | Total Duty Collected ex-manufactory, including License Fees. |
|---|---|---|---|---|---|---|---|---|
| Paid Duty. | Warehoused | Produced. | Paid Duty. | Warehoused. | Produced. | Paid Duty. | Warehoused. | |
| No. | No. | No. | No. | No. | No. | No. | No. | $ cts. |
| 124,000 | 585,400 | .... | .... | .... | .... | .... | .... | 819 00 |
| 2,831,880 | 1,216,135 | .... | .... | .... | .... | .... | .... | 17,516 28 |
| 2,751,715 | 2,412,990 | .... | .... | .... | .... | .... | .... | 17,410 29 |
| 2,875,180 | 7,306,560 | .... | .... | .... | .... | .... | .... | 18,301 68 |
| 699,800 | 1,989,925 | .... | .... | .... | .... | .... | .... | 4,423 80 |
| 20,988,970 | 11,946,040 | .... | .... | .... | .... | .... | .... | 127,546 32 |
| 67,950 | 608,150 | .... | .... | .... | .... | .... | .... | 520 20 |
| 261,620 | 500,200 | .... | .... | .... | .... | .... | .... | 1,819 99 |
| 23,125 | 97,775 | .... | .... | .... | .... | .... | .... | 245 99 |
| 80,450 | 14,000 | .... | .... | .... | .... | .... | .... | 557 70 |
| 439,700 | 191,300 | .... | .... | .... | .... | .... | .... | 2,863 20 |
| 1,195,100 | 192,625 | .... | .... | .... | .... | .... | .... | 7,921 50 |
| 1,408,975 | 218,750 | .... | .... | .... | .... | .... | .... | 8,682 45 |
| 10,415,120 | 5,729,625 | .... | .... | .... | .... | .... | .... | 64,544 96 |
| 1,055,305 | 505,950 | .... | .... | .... | .... | .... | .... | 6,788 97 |
| 45,218,890 | 33,515,425 | .... | .... | .... | .... | .... | .... | 279,962 33 |
| 6,000 | 18,950 | 2.416.700 | 1,699,500 | 717.200 | 315,200 | 90,800 | 224,400 | 5,609 40 |
| 23,166,120 | 30,122,605 | .... | .... | .... | 2,841,555 | 1,594,405 | 1.247,150 | 146,822 69 |
| 2,726,735 | 3,545,175 | .... | .... | .... | 360,150 | 97,900 | 262,250 | 17,169 93 |
| 324,970 | 1,373.250 | 518,860 | 485,760 | 33,100 | 63,850 | 46,800 | 17,050 | 3,837 50 |
| 3,560,610 | 3,813,655 | .... | .... | .... | .... | .... | .... | 21,843 33 |
| 153,310 | 228,200 | .... | .... | .... | 360.850 | 128,050 | 232.800 | 1,519 01 |
| 29,937.745 | 39,101,835 | 2.935,560 | 2,185,260 | 750,300 | 3,941,605 | 1,957,955 | 1,983,650 | 196,801 86 |
| 316,015 | 605,650 | .... | .... | .... | 2,623,875 | 679,225 | 1,944.650 | 4,428 77 |
| 350,950 | 403,155 | .... | .... | .... | .... | .... | .... | 2,330 70 |
| 2,377,960 | 4,761,590 | .... | .... | .... | .... | .... | .... | 14,942 76 |
| 208,385 | 272,500 | .... | .... | .... | .... | .... | .... | 1.400 31 |
| 3,362,825 | 255,600 | .... | .... | .... | 40,000 | 40,000 | .... | 21,263 97 |
| 1,257,425 | 439,575 | .... | .... | .... | 57,850 | 57,850 | .... | 8,623 22 |
| 4.620,250 | 695,175 | .... | .... | .... | 97,850 | 97,850 | .... | 29,887 19 |
| 83.030.195 | 79,355.330 | 2.935.560 | 2.185.260 | 750,300 | 6,663,330 | 2,735,030 | 3,928,300 | 529,753 92 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—CIGARS.

DR. No. 21.—COMPARATIVE STATEMENT of Manufactures

| PROVINCES. | LICENSES. | | Total weight of Raw Leaf Tobacco and all other materials actually used. | Deficiencies paying Duty. | CIGARS AT $7 PER THOUSAND. | | CIGARS |
|---|---|---|---|---|---|---|---|
| | No. | Fees. | | | Produced. | Paid Duty. | Produced. |
| 1902. | | $ cts. | Lbs. | No. | No. | No. | No. |
| Ontario | 117 | 8,475 00 | 1,263,808¾ | | 1,710 | 1,710 | 72,106,200 |
| Quebec | 59 | 4,037 50 | 1,320,034½ | 3,510 | 1,950 | 1,950 | 61,368,315 |
| New Brunswick | 7 | 495 00 | 63,404 | | | | 1,116,305 |
| Nova Scotia | 3 | 225 00 | 11,597½ | | | | 679,800 |
| Manitoba | 7 | 525 00 | 106,255 | | | | 5,948,910 |
| North-west Territories | 2 | 150 00 | 6,707 | | | | 352,960 |
| British Columbia | 25 | 1,855 00 | 102,029½ | 586 | | | 5,294,550 |
| Totals | 220 | 15,762 50 | 2,873,836¼ | 4,096 | 3,660 | 3,660 | 146,867,040 |
| 1903. | | | | | | | |
| Ontario | 115 | 8,550 00 | 1,384,624¾ | 14,725 | 1,521 | 1,521 | 78,734,315 |
| Quebec | 62 | 4,290 00 | 1,425,791¼ | 65,107 | 9,294 | 9,294 | 69,039,580 |
| New Brunswick | 7 | 495 00 | 66,431¾ | | | | 921,665 |
| Nova Scotia | 3 | 225 00 | 13,623 | | | | 754,105 |
| Manitoba | 9 | 675 00 | 131,551½ | | | | 7,139,550 |
| North-west Territories | 2 | 150 00 | 9,939½ | | | | 480,885 |
| British Columbia | 26 | 1,850 00 | 99,415½ | *5,043 | 1,002 | 1,002 | 5,315,425 |
| Totals | 224 | 16,235 00 | 3,131,377¼ | 84,875 | 11,817 | 11,817 | 162,385,525 |

†Destroyed by fire. *Combination cigars at $3 per M.

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

for the years ended June 30, 1902 and 1903. Cr.

| at $6 per Thousand. | | Canadian Cigars at $3 per Thousand. | | | Combination Cigars at $3 per Thousand. | | | Total Duty collected ex-Manufactory, including License Fees |
|---|---|---|---|---|---|---|---|---|
| Paid Duty. | Warehoused | Produced. | Paid Duty | Warehoused. | Produced. | Paid Duty | Warehoused. | |
| No. | No. | No. | No. | No. | No. | No. | No. | No. |
| †3,400 | | | | | | | | |
| 41,400,745 | 30,702,055 | | | | | | | 256,891 44 |
| 30,996,935 | 30.371,380 | 3,766,600 | 2,961,230 | 805,370 | 3,545,430 | 2,373,480 | 1,171,950 | 206,057 98 |
| 392,025 | 724,280 | | | | 2,253,090 | 362,940 | 1,890,150 | 3,935 97 |
| 352,180 | 327,620 | | | | | | | 2,338 08 |
| 2,208,005 | 3,740,905 | | | | | | | 13,773 03 |
| 120,635 | 232,325 | | | | | | | 873 81 |
| 4,337,250 | 957,300 | | | | 250,975 | 190,925 | 60,050 | 28,454 78 |
| †3,400 | | | | | | | | |
| 79,807,775 | 67,055,865 | 3,766,600 | 2,961,230 | 805,370 | 6,049,495 | 2,927,345 | 3,122.150 | 512,325 09 |
| 45,218,890 | 33,515,425 | | | | | | | 279,962 33 |
| 29,937,745 | 39,101,835 | 2,935,560 | 2,185,260 | 750,300 | 3,941,605 | 1,957,955 | 1,983.650 | 196,801 86 |
| 316,015 | 605,650 | | | | 2,623,875 | 679,225 | 1.944,650 | 4,428 77 |
| 350,950 | 403,155 | | | | | | | 2,330 70 |
| 2,377,960 | 4,761,590 | | | | | | | 14,942 76 |
| 208,385 | 272,500 | | | | | | | 1,400 31 |
| 4,620,250 | 695,175 | | | | 97,850 | 97,850 | | 29,887 19 |
| 83,030,195 | 79.355.330 | 2,935,560 | 2,185,260 | 750,300 | 6,663,330 | 2,735,030 | 3,928,300 | 529,753 92 |

W. J. GERALD,
*Deputy Minister.*

APPENDIX A—*Continued*—CIGARS.

Dr. Cr.

## No. 22. WAREHOUSE Return for the Year ended June 30, 1903.

| Remaining in Warehouse from last year. | | | Placed in Warehouse. | | | Received from other Divisions. | | Total Number to be Accounted for. | | | Divisions | Entered for Consumption. | | | | Removed in bond to other Divisions. | | Exported. | | Written off. | Remaining in Warehouse. | | | Total Number Accounted for. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Foreign. | Canadian | Combination | Foreign. | Canadian | Combination. | Foreign. | Canadian. | Foreign. | Canadian | Combination. | | Foreign at $6 p.M | Canadian at $3 p.M. | Combination at $3 p.M. | Duty | Foreign. | Canadian. | Foreign. | Combination | Foreign. | Foreign. | Canadian. | Combination | Foreign. | Canadian. | Combination. |
| No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | | No. | No. | No. | $ cts. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. |
| 240,350 | | | 585,400 | | | | | 825,750 | | | Belleville, Ont. | 407,000 | | | 2,442 00 | 135,750 | | | | | 283,000 | | | 825,750 | | |
| 489,175 | | | 1,216,135 | | | 20,000 | | 1,725,310 | | | Brantford " | 1,174,150 | | | 7,044 90 | | | | | | 551,160 | | | 1,725,310 | | |
| 513,485 | | | 2,412,990 | | | | | 2,926,475 | | | Guelph " | 2,486,100 | | | 14,916 60 | | | | | | 440,375 | | | 2,926,475 | | |
| 2,562,030 | | | 7,306,560 | | | 360,000 | | 10,228,590 | | | Hamilton " | 7,932,995 | | | 47,597 97 | | | 8,000 | | | 2,287,595 | | | 10,228,590 | | |
| 881,475 | | | 1,989,925 | | | 135,750 | | 3,007,150 | | | Kingston " | 2,406,800 | | | 14,440 80 | | | | | 112,500 | 487,850 | | | 3,007,150 | | |
| 3,123,230 | | | 11,946,040 | | | 92,500 | | 15,161,770 | | | London " | 10,741,800 | | | 64,450 80 | 887,650 | | | | | 3,532,320 | | | 15,161,770 | | |
| 39,350 | | | 608,150 | | | | | 647,500 | | | Ottawa " | 419,350 | | | 2,516 10 | | | | | | 228,150 | | | 647,500 | | |
| 110,200 | | | 500,200 | | | | | 610,400 | | | Owen Sound " | 401,000 | | | 2,406 00 | | | | | | 209,400 | | | 610,400 | | |
| 134,335 | 3,800 | | 97,775 | | | | 20,000 | 232,110 | 23,800 | | Perth " | 101,110 | 20,000 | | 668 46 | | | | | | 130,700 | 3,800 | | 232,110 | 23,800 | |
| 46,450 | | | 14,000 | | | | | 60,450 | | | Peterborough " | 38,000 | | | 228 00 | | | | | | 22,450 | | | 60,450 | | |
| 33,150 | | | 191,300 | | | | | 224,450 | | | Prescott " | 203,600 | | | 1,221 60 | | | | | | 20,850 | | | 224,450 | | |
| 22,225 | | | 192,625 | | | | | 214,850 | | | St. Catharines " | 140,850 | | | 845 10 | | | | | | 74,000 | | | 214,850 | | |
| | | | 218,750 | | | | | 218,750 | | | Stratford " | 188,900 | | | 1,133 40 | | | | | | 29,850 | | | 218,750 | | |
| 1,287,460 | | | 5,729,625 | | | 317,900 | | 7,334,985 | | | Toronto " | 5,037,675 | | | 30,226 05 | 967,200 | | 10,500 | | | 1,319,610 | | | 7,334,985 | | |
| 248,425 | | | 505,950 | | | | | 754,375 | | | Windsor " | 584,075 | | | 3,504 45 | | | | | | 170,300 | | | 754,375 | | |
| 9,731,340 | 3,800 | | 33,515,425 | | | 926,150 | 20,000 | 44,172,915 | 23,800 | | Totals | 32,263,705 | 20,000 | | 193,642 23 | 1,990,600 | | 18,500 | | 112,500 | 9,787,610 | 3,800 | | 44,172,915 | 23,800 | |
| | 58,200 | | 18,950 | 717,200 | 224,400 | | | 18,950 | 775,400 | 224,400 | Joliette, Que. | 2,000 | 530,950 | 163,100 | 2,094 15 | | 20,000 | | | | 16,950 | 224,450 | 61,300 | 18,950 | 775,400 | 224,400 |
| 6,620,345 | | 132,500 | 30,122,605 | | 1,247,150 | 1,180,950 | | 37,923,900 | | 1,379,650 | Montreal " | 29,008,995 | | 850,965 | 176,606 87 | 142,000 | | 93,420 | 300 | 549,950 | 8,129,535 | | 528,385 | 37,923,900 | | 1,379,650 |
| 1,084,590 | 45,000 | 98,950 | 3,545,175 | | 262,250 | | | 4,629,765 | 45,000 | 361,200 | Quebec " | 3,171,715 | 45,000 | 254,450 | 19,928 64 | | | | | | 1,458,050 | | 106,750 | 4,629,765 | 45,000 | 361,200 |
| 135,215 | 67,050 | 11,150 | 1,373,250 | 33,100 | 17,050 | | | 1,508,465 | 100,150 | 28,200 | St. Hyacinthe " | 1,141,840 | 100,150 | 28,200 | 7,236 09 | | | | | | 366,625 | | | 1,508,465 | 100,150 | 28,200 |
| 937,245 | | | 3,813,655 | | | | | 4,750,900 | | | Sherbrooke " | 3,376,985 | | | 20,261 91 | 5,000 | | | | | 1,368,915 | | | 4,750,900 | | |
| 217,150 | | 110,150 | 228,200 | | 232,800 | | | 445,350 | | 342,950 | Three Rivers " | 270,600 | | 329,500 | 2,612 10 | | | | | | 174,750 | | 13,450 | 445,350 | | 342,950 |
| 8,994,545 | 170,250 | 352,750 | 39,101,835 | 750,300 | 1,983,650 | 1,180,950 | | 49,277,330 | 920,550 | 2,336,400 | Totals | 36,972,135 | 676,100 | 1,626,215 | 228,739 76 | 147,000 | 20,000 | 93,420 | 300 | 549,950 | 11,514,825 | 224,450 | 709,885 | 49,277,330 | 920,550 | 2,336,400 |
| 278,255 | | 725,350 | 695,650 | | 1,944,650 | | | 973,905 | | 2,670,000 | St. John, N.B. | 640,150 | | 1,836,950 | 9,351 75 | | | 5,000 | 18,500 | | 328,755 | | 814,550 | 973,905 | | 2,670,000 |
| 223,820 | | | 403,155 | | | 30,500 | | 657,475 | | | Halifax, N.S. | 409,960 | | | 2,459 76 | | | 46,300 | | | 201,215 | | | 657,475 | | |
| 810,545 | | | 4,761,500 | | | | | 5,572,045 | | | Winnipeg, Man. | 4,739,630 | | | 28,437 78 | | | | | | 832,415 | | | 5,572,045 | | |
| 29,650 | | | 272,500 | | | | | 302,150 | | | Calgary, N.W.T. | 245,675 | | | 1,474 05 | | | | | | 56,475 | | | 302,150 | | |
| 113,500 | | 80,050 | 255,600 | | | | | 369,100 | | 80,050 | Vancouver, B.C. | 319,600 | | 80,050 | 2,157 75 | | | | | | 49,500 | | | 369,100 | | 80,050 |
| 219,050 | | | 439,575 | | | | | 658,625 | | | Victoria " | 413,075 | | | 2,478 45 | | | 8,900 | | | 236,650 | | | 658,625 | | |
| 332,550 | | 80,050 | 695,175 | | | | | 1,027,725 | | 80,050 | Totals | 732,675 | | 80,050 | 4,636 20 | | | 8,900 | | | 286,150 | | | 1,027,725 | | 80,050 |
| 20,490,615 | 174,050 | 1,158,150 | 79,355,330 | 750,300 | 3,928,300 | 2,137,600 | 20,000 | 101,983,545 | 944,350 | 5,086,450 | Grand Totals | 76,003,930 | 696,100 | 3,543,215 | 468,741 53 | 2,137,600 | 20,000 | 172,120 | 18,800 | 662,450 | 23,007,445 | 228,250 | 1,524,435 | 101,983,545 | 944,350 | 5,086,450 |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

APPENDIX A.—*Continued*—CIGARS

Dr.

## No. 23.—Comparative Statement of Warehouse Returns for the Years ended June 30, 1902 and 1903.

Cr.

| Remaining in Warehouse from last year. | | | Placed in Warehouse. | | | Received from other Divisions. | | Re-imported. | Total Number to be Accounted for. | | | Provinces. | Entered for Consumption. | | | | Removed in Bond to other Divisions. | | Exported. | | Taken for re-working | Written off. | Remaining in Warehouse | | | Total Number Accounted for | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Foreign. | Canadian | Combination. | Foreign. | Canadian | Combination. | Foreign. | Canadian | Foriegn. | Foreign. | Canadian | Combination. | | Foreign, at $6 per M. | Canadian, at $3 per M. | Combination, at $3 per M. | Duty. | Foreign. | Canadian | Foreign. | Combination. | Foreign | Foreign. | Foreign. | Canadian | Combination. | Foreign. | Canadian | Combination. |
| No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | 1902. | No. | No. | No. | $ cts. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. |
| 8,061,575 | 29,600 | | 30,702,055 | | | 72,000 | 25,000 | 450 | 38,836,080 | 54,600 | | Ontario | 28,270,180 | 50,800 | | 169,773 48 | 833,835 | | 725 | | | | 9,731,340 | 3,800 | | 38,836,080 | 54,600 | |
| 6,371,460 | 90,000 | 342,650 | 30,371,380 | 805,370 | 1,171,950 | 1,673,335 | 45,000 | | 38,416,175 | 940,370 | 1,514,600 | Quebec | 28,450,160 | 700,120 | 1,161,150 | 176,284 77 | 921,500 | 70,000 | 49,970 | 700 | | | 8,994,545 | 170,250 | 352,750 | 38,416,175 | 940,370 | 1,514,600 |
| 302,025 | | 726,800 | 724,280 | | 1,890,150 | | | | 1,026,305 | | 2,616,950 | New Brunswick | 640,300 | | 1,840,200 | 9,362 40 | | | 17,750 | 51,400 | | | 368,255 | | 725,350 | 1,026,305 | | 2,616,950 |
| 194,710 | | | 327,620 | | | 10,000 | | | 532,330 | | | Nova Scotia | 300,410 | | | 1,802 46 | | | 8,100 | | | | 223,820 | | | 532,330 | | |
| 549,190 | | | 3,740,905 | | | | | | 4,290,095 | | | Manitoba | 3,479,640 | | | 20,877 84 | | | | | | | 810,455 | | | 4,290,095 | | |
| 8,800 | | | 232,325 | | | | | | 241,125 | | | N.-W. Territories | 211,475 | | | 1,268 85 | | | | | | | 29,650 | | | 241,125 | | |
| 296,125 | | 75,500 | 957,300 | | 60,050 | | | | 1,253,425 | | 135,550 | British Columbia | 916,475 | | 55,500 | 5,665 35 | | | 650 | | 3,750 | | 332,550 | | 80,050 | 1,253,425 | | 135,550 |
| 15,783,885 | 119,600 | 1,144,950 | 67,055,865 | 805,370 | 3,122,150 | 1,755,335 | 70,000 | 450 | 84,595,535 | 994,970 | 4,267,100 | Totals | 62,268,640 | 750,920 | 3,056,850 | 385,035 15 | 1,755,335 | 70,000 | 77,195 | 52,100 | 3,750 | | 20,490,615 | 174,050 | 1,158,150 | 84,595,535 | 994,970 | 4,267,100 |
| | | | | | | | | | | | | 1903. | | | | | | | | | | | | | | | | |
| 9,731,340 | 3,800 | | 33,515,425 | | | 926,150 | 20,000 | | 44,172,915 | 23,800 | | Ontario | 32,263,705 | 20,000 | | 193,642 23 | 1,990,600 | | 18,500 | | | 112,500 | 9,787,610 | 3,800 | | 44,172,915 | 23,800 | |
| 8,994,545 | 170,250 | 352,750 | 39,101,835 | 750,300 | 1,983,650 | 1,180,950 | | | 49,277,330 | 920,550 | 2,336,400 | Quebec | 36,972,135 | 676,100 | 1,626,215 | 228,739 76 | 147,000 | 20,000 | 93,420 | 300 | | 549,950 | 11,514,825 | 224,450 | 709,885 | 49,277,330 | 920,550 | 2,336,400 |
| 368,255 | | 725,350 | 605,650 | | 1,944,650 | | | | 973,905 | | 2,670,000 | New Brunswick | 640,150 | | 1,836,950 | 9,351 75 | | | 5,000 | 18,500 | | | 328,755 | | 814,550 | 973,905 | | 2,670,000 |
| 223,820 | | | 403,155 | | | 30,500 | | | 657,475 | | | Nova Scotia | 409,960 | | | 2,459 76 | | | 46,300 | | | | 201,215 | | | 657,475 | | |
| 810,455 | | | 4,761,590 | | | | | | 5,572,045 | | | Manitoba | 4,739,630 | | | 28,437 78 | | | | | | | 832,415 | | | 5,572,045 | | |
| 29,650 | | | 272,500 | | | | | | 302,150 | | | N.-W. Territories | 245,675 | | | 1,474 05 | | | | | | | 56,475 | | | 302,150 | | |
| 332,550 | | 80,050 | 695,175 | | | | | | 1,027,725 | | 80,050 | British Columbia | 732,675 | | 80,050 | 4,636 20 | | | 8,900 | | | | 286,150 | | | 1,027,725 | | 80,050 |
| 20,490,615 | 174,050 | 1,158,150 | 79,355,330 | 750,300 | 3,928,300 | 2,137,600 | 20,000 | | 101,983,545 | 944,350 | 5,086,450 | Totals | 76,003,930 | 696,100 | 3,543,215 | 468,741 53 | 2,137,600 | 20,000 | 172,120 | 18,800 | | 662,450 | 23,007,445 | 228,250 | 1,524,435 | 101,983,545 | 944,350 | 5,086,450 |

| | 1902. | 1903. |
|---|---|---|
| Total duty collected, ex-manufactory and ex-warehouse | $ 881,597 74 | $ 982,260 45 |
| " " on licenses | 15,762 50 | 16,235 00 |
| Totals | $ 897,360 24 | $ 998,495 45 |

Inland Revenue Department,
Ottawa, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—INSPECTION OF PETROLEUM.

### No. 24.—RETURN of Canadian Petroleum and Naphtha inspected during the Year ended June 30, 1903.

| Divisions. | Licenses. | | Petroleum. | Naphtha. | Total. |
|---|---|---|---|---|---|
| | No. | Fees. | | | |
| | | $ | Galls. | Galls. | Galls. |
| London.... .... .... .... ....... | 2 | 2 | 7,784,179·80 | 831,712·21 | 8,615,892·01 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## No. 25.—COMPARATIVE STATEMENT of Petroleum and Naphtha inspected during the Years ended June 30, 1902 and 1903.

| PROVINCES. | LICENSES. | | Petroleum. | Naphtha. | Totals. |
|---|---|---|---|---|---|
| | No. | Fees. | | | |
| 1902. | | $ | Galls. | Galls. | Galls. |
| Ontario | 2 | 2 | 9,412,940·64 | 1,081,933·58 | 10,494,874·22 |
| 1903. | | | | | |
| Ontario | 2 | 2 | 7,784,179·80 | 831,712·21 | 8,615,892·01 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## APPENDIX A—*Continued*—MANUFACTURES IN BOND.

### No. 26.—Return of Manufactures

| Divisions. | Licenses. | | Materials Used. | | | |
|---|---|---|---|---|---|---|
| | No. | Fees. | Spirits. | Beer, Wine, &c. | Nitric Acid. | Mercury. |
| | | $ cts. | Galls. | Galls. | Lbs. | Lbs. |
| Brantford, Ont. | 2 | 100 00 | 11,815·71 | *106·30<br>23·00 | ... | ... |
| Hamilton " | 2 | 100 00 | 23.077·52 | 356·90 | ... | ... |
| Kingston " | 1 | 50 00 | 8,368·39 | 255·50 | ... | ... |
| Prescott " | 1 | 300 00 | 163,449·60 | ... | 809,801 | 86,069 |
| Toronto " | 4 | 200 00 | 58,316·41 | 631·80 | ... | ... |
| Windsor " | 3 | 400 00 | 7,778·95 | ... | 37,117 | 4,743 |
| Totals | 13 | 1,150 00 | 272,806·58 | *106·30<br>1,267·20 | 846,918 | 90,812 |
| Montreal, Que | 5 | 250 00 | 53,349·75 | 894·60 | ... | ... |
| Quebec " | 1 | 50 00 | 7,717·48 | 382·00 | ... | ... |
| St. Hyacinthe, Que | 2 | 100 00 | 20,645·80 | 451 70 | ... | ... |
| Sherbrooke " | 1 | 300 00 | 57,251·21 | ... | 261,515 | 33,607 |
| Totals | 9 | 700 00 | 138,964·24 | 1,728·30 | 261,515 | 33,607 |
| St. John, N. B. | 2 | 100 00 | 6,859·77 | 250 10 | ... | ... |
| Winnipeg, Man | 1 | 50 00 | ... | ... | ... | ... |
| Grand totals | 25 | 2,000 00 | 418,630·59 | *160·30<br>3,245·60 | 1,108,43 | 124,419 |

* Malt extract.

Inland Revenue Department,
Ottawa, August 18, 1903.

for the Year ended June 30, 1903.

| Manufactured. | | Paid Duty ex-Manufactory. | | Warehoused. | | Total Duty Collected ex-Manufactory, including License Fees. |
|---|---|---|---|---|---|---|
| Vinegar. | Crude Fulminate. | Vinegar. | Duty. | Vinegar. | Crude Fulminate. | |
| Galls. | Lbs. | Galls. | $ cts. | Galls. | Lbs. | $ cts. |
| 57,108 00 | .. ......... | 57,108·00 | 2,342 17 | .. ........... | ..... ..... .. | 2,442 17 |
| 146,719·09 | ............. | 21,530·33 | 861 22 | 125,188·76 | .............. | 961 22 |
| 61,288·48 | .... ...... .... | 10,316·09 | 412 64 | 50,972 39 | .............. | 462 64 |
| ............ . | 104,721 | ....... ... | ....... ..... | .... ..... . | 104.721 | 300 00 |
| 364,705·86 | ....... ..... | 179,705·34 | 7.188 18 | 185,000·52 | .... ...... | 7,388 18 |
| . .......... | 5,501 | ........ ... | .... ......... | ....... . .... | 5,501 | 400 00 |
| 629,821·43 | 110,222 | 268,659·76 | 10,804 21 | 361,161·67 | 110,222 | 11,954 21 |
| 283,026·78 | ....... ... | 192,410·75 | 7,696 43 | 90.616·03 | .... ......... | 7,946 43 |
| 35,111·39 | .............. | 22.004·57 | 880 17 | 13,106·82 | ............. | 930 17 |
| 111,551·59 | .............. | 70,014·27 | 2,800 58 | 41,537·32 | ........ .. | 2,900 58 |
| .... ......... | 38,878 | ............. | ....... .... | ......... ... . | 38,878 | 300 00 |
| 429,689·76 | 38,878 | 284,429·59 | 11,377 18 | 145,260·17 | 38,878 | 12,077 18 |
| 41,881·24 | ...... . ..... | 35,857·16 | 1,434 24 | 6,024·08 | ... .......... | 1,534 24 |
| ... .. ...... | .. . ........ | .... ......... | .......... .. | .... ... . | ........... . | 50 00 |
| 1,101.392·43 | 149,100 | 588,946·51 | 23,615 63 | 512,445·92 | 149,100 | 25.615 63 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—MANUFACTURES IN BOND.

### No. 27.—Comparative Statement of Manufactures

| Provinces. | Licenses. | | Materials Used. | | | |
|---|---|---|---|---|---|---|
| | No. | Fees. | Spirits. | Beer, Wine, &c. | Nitric Acid. | Mercury. |
| 1902. | | $ | Galls. | Galls. | Lbs. | Lbs. |
| Ontario | 14 | 1,450 | 214,682·50 | 1,904·30 | 679,674 | 73,741·50 |
| Quebec | 12 | 825 | 139,853·07 | 2,818·80 | 226,217 | 28,367·00 |
| New Brunswick | 2 | 100 | 5,623·57 | 259·75 | ........... | ........... |
| Manitoba | 1 | 50 | ........... | ........... | ........... | ........... |
| Totals | 29 | 2,425 | 360,159·14 | 4,982 85 | 905,891 | 102.048·50 |
| 1903. | | | | | | |
| Ontario | 13 | 1,150 | 272,806·58 | *106·30<br>1,267·20 | 846,918 | 90,812 |
| Quebec | 9 | 700 | 138,964·24 | 1,728·30 | 261,515 | 33,607 |
| New Brunswick | 2 | 100 | 6,859·77 | 250·10 | ........... | ........... |
| Manitoba | 1 | 50 | ........... | ........... | ........... | ........... |
| Totals | 25 | 2,000 | 418,630·59 | 3,245·60<br>*106·30 | 1,108,433 | 124,419 |

* Malt Extract.

Inland Revenue Department,
Ottawa, August 18, 1903.

for the Years ended June 30, 1902 and 1903.

| Manufactured. | | Paid Duty ex-Manufactory. | | Warehoused. | | Total Duty Collected ex-Manufactory, including License Fees. |
|---|---|---|---|---|---|---|
| Vinegar. | Crude Fulminate. | Vinegar. | Duty. | Vinegar. | Crude Fulminate. | |
| Galls. | Lbs. | Galls | $ cts. | Galls. | Lbs. | $ cts |
| 491.999·78 | 90,422·30 | 172,210·93 | 6.888 47 | 319,788·85 | 90,422·30 | 8,338 47 |
| 496,314·53 | 31,185·00 | 335,122·70 | 13,404 90 | 161,191·83 | 31,185·00 | 14,229 90 |
| 32,181·78 | ............. | 27,984·41 | 1,119 35 | 4,197·37 | ............ | 1,219 35 |
| ............. | ........... | ............ | ........... | .......... | ......... | 50 00 |
| 1,020,496·09 | 121,607·30 | 535.318·04 | 21,412 72 | 485,178·05 | 121.607·30 | 23,837 72 |
| 629,821·43 | 110,222·00 | 268,659·76 | 10,804 21 | 361,161·67 | 110,222·00 | 11,954 21 |
| 429,689·76 | 38,878·00 | 284,429·59 | 11,377 18 | 145,260·17 | 38,878·00 | 12.077 18 |
| 41,881·24 | ............ | 35,857·16 | 1,434 24 | 6,024·08 | ............ | 1,534 24 |
| ............ | ............. | ............ | ............ | ........... | ............. | 50 00 |
| 1,101,392·43 | 149,100·00 | 588.946·51 | 23,615 63 | 512,445·92 | 149,100·00 | 25,615 63 |

W. J. GERALD,
*Deputy Minister.*

APPENDIX A—*Continued*—MANUFACTURES IN BOND.

DR. No. 28.—WAREHOUSE RETURN for

| Remaining in Warehouse from last year. | Placed in Warehouse. | | Received from other Divisions. | Totals. | | DIVISIONS. |
|---|---|---|---|---|---|---|
| Vinegar. | Vinegar. | Crude Fulminate. | Vinegar. | Vinegar. | Crude Fulminate. | |
| Galls. | Galls. | Lbs. | Galls. | Galls. | Lbs. | |
| 612·00 | .......... | .......... | .......... | 612·00 | .......... | ..Brantford, Ont. ....... |
| 43,510·14 | 125,188·76 | .......... | .......... | 168,698·90 | .......... | ..Hamilton " ...... |
| 8,428·83 | 50,972·39 | .......... | .......... | 59,401·22 | .......... | ..Kingston " ........ |
| .......... | .......... | 104,721 | .......... | .......... | 104,721 | ..Prescott " ........ |
| 64,393·73 | 185,000·52 | .......... | .......... | 249,394·25 | .......... | ..Toronto " ........ |
| .......... | .......... | 5,501 | .......... | .......... | 5,501 | ..Windsor " ........ |
| 116,944·70 | 361,161·67 | 110,222 | .......... | 478,106·37 | 110,222 | ...... Totals........... |
| 40,022·82 | 90,616·03 | .......... | .......... | 130,638·85 | .......... | ..Montreal, Que......... |
| 24,183·27 | 13,106·82 | .......... | .......... | 37,290·09 | .......... | ..Quebec " ....... |
| 66,565·27 | 41,537·32 | .......... | .......... | 108,102·59 | .......... | ..St. Hyacinthe, Que..... |
| .......... | .......... | 38,878 | .......... | .......... | 38,878 | ..Sherbrooke " .... |
| 130,771·36 | 145,260·17 | 38,878 | .......... | 276,031·53 | 38,878 | .......Totals.......... |
| 2,079·71 | 6,024.08 | .......... | .......... | 8,103·79 | .......... | ..St. John, N.B......... |
| .......... | .......... | .......... | 51,197·10 | 51,197·10 | .......... | ..Winnipeg, Man ........ |
| 249,795 77 | 512,445 92 | 149,100 | 51,197·10 | 813,438·79 | 149,100 | ........Grand Totals..... |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

the Year ended June 30, 1903. Cr.

| Entered for Consumption. | | Removed to other Divisions. | Exported. | Remaining in Warehouse. | Totals. | |
|---|---|---|---|---|---|---|
| Vinegar. | Duty. | Vinegar. | Crude Fulminate. | Vinegar. | Vinegar. | Crude Fulminate. |
| Galls. | $ cts. | Galls. | Lbs. | Galls. | Galls. | Lbs. |
| 612·00 | 24 48 | .... | .... | .... | 612·00 | .... |
| 103,187·86 | 4,127 50 | 27,153·01 | .... | 38,358·03 | 168,698·90 | .... |
| 42,374·21 | 1,694 95 | .... | .... | 17,027·01 | 59,401·22 | .... |
| .... | .... | .... | 104,721 | .... | .... | 104,721 |
| 142,720·11 | 5,708 86 | 24,044·09 | .... | 82,630·05 | 249,394·25 | .... |
| .... | .... | .... | 5,501 | .... | .... | 5,501 |
| 288,894·18 | 11,555 79 | 51,197·10 | 110,222 | 138,015·09 | 478,106·37 | 110,222 |
| 67,004·40 | 2,680 22 | .... | .... | 63,634·45 | 130,638·85 | .... |
| 27,836·81 | 1,113 49 | .... | .... | 9,453·28 | 37,290 09 | .... |
| 51,638·00 | 2,065 53 | .... | .... | 56,464·59 | 108,102·59 | .... |
| .... | .... | .... | 38,878 | .... | .... | 38,878 |
| 146,479·21 | 5,859 24 | .... | 38,878 | 129,552·32 | 276,031·53 | 38,878 |
| 6,241·26 | 249 65 | .... | .... | 1,862·53 | 8,103·79 | .... |
| 43,580·78 | 1,743 23 | .... | .... | 7,616·32 | 51,197·10 | .... |
| 485,195·43 | 19,407 91 | 51,197·10 | 149,100 | 277,046·26 | 813,438·79 | 149,100 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—MANUFACTURES IN BOND.

DR. No. 29.—COMPARATIVE STATEMENT of Warehouse Returns

| Remaining in Warehouse from Last Year. | Placed in Warehouse. | | Received from other Divisions. | Totals. | | PROVINCES. |
|---|---|---|---|---|---|---|
| Vinegar. | Vinegar. | Crude Fulminate. | Vinegar. | Vinegar. | Crude Fulminate. | |
| Galls. | Galls. | Lbs. | Galls. | Galls. | Lbs. | 1902. |
| 207,808·80 | 319,788·85 | 90,422·30 | ........... | 527,597·65 | 90,422·30 | ..Ontario ..... .. ...... |
| 91,442·98 | 161,191·83 | 31,185·00 | ...... .... | 252,634·81 | 31,185·00 | ..Quebec................ |
| 6,320·55 | 4,197·37 | ..... ...... | ... ...... | 10,517·92 | .... ..... | ..New Brunswick .. . . . |
| .... .. . | ........... | ... ...... | 16,536·50 | 16,536·50 | ............ | ..Manitoba . .. ......... |
| 305,572·33 | 485,178·05 | 121,607·30 | 16,536·50 | 807,286·88 | 121,607·30 | .......Totals.......... |
| | | | | | | 1903. |
| 116,944·70 | 361,161·67 | 110,222·00 | ........... | 478,106·37 | 110,222·00 | ..Ontario........... .... |
| 130,771·36 | 145,260·17 | 38,878·00 | .... ...... | 276,031·53 | 38,878·00 | ..Quebec ... .... ........ |
| 2,079·71 | 6,024·08 | .......... . | . . ....... | 8,103·79 | ............ | ..New Brunswick ... .. . |
| ........... | ... ........ | .... ..... . | 51,197·10 | 51,197·10 | . .. ..... | ..Manitoba ............ |
| 249,795·77 | 512,445·92 | 149,100·00 | 51,197·10 | 813,438·79 | 149,100·00 | Totals...... .... |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

for the Years ended June 30, 1902 and 1903. Cr.

| Entered for Consumption. | | Removed to other Divisions. | Exported. | | Written off. | Remaining in Warehouse. | Totals. | |
|---|---|---|---|---|---|---|---|---|
| Vinegar. | Duty. | Vinegar. | Vinegar. | Crude Fulminade | Vinegar. | Vinegar. | Vinegar. | Crude Fulminate. |
| Galls. | $ cts. | Galls. | Galls. | Lbs. | Galls. | Galls. | Galls. | Lbs. |
| 389,878·80 | 15,595·16 | 16,536·50 | 1,498·44 | 90,422·30 | 2,739·21 | 116,944·70 | 527,597·65 | 90,422·30 |
| 121,863·45 | 4,874·54 | ........ | ........ | 31,185.00 | ........ | 130,771·36 | 252,634·81 | 31,185·00 |
| 8,438·21 | 337·52 | ........ | ........ | ........ | ........ | 2,079·71 | 10,517·92 | ........ |
| 16,536.50 | 661·46 | ........ | ........ | ........ | ........ | ........ | 16,536·50 | ........ |
| 536,716·96 | 21,468·68 | 16,536·50 | 1,498·44 | 121,607·30 | 2,739·21 | 249,795·77 | 807,286·88 | 121,607·30 |
| | | | | | | | | |
| 288,894·18 | 11,555·79 | 51,197·10 | ........ | 110,222·00 | ........ | 138,015·09 | 478,106·37 | 110,222·00 |
| 146,479·21 | 5,859·24 | ........ | ........ | 38,878·00 | ........ | 129,552·32 | 276,031·53 | 38,878·00 |
| 6,241·26 | 249·65 | ........ | ........ | ........ | ........ | 1,862·53 | 8,103·79 | ........ |
| 43,580·78 | 1,743·23 | ........ | ........ | ........ | ........ | 7,616·32 | 51,197·10 | ........ |
| 485,195·43 | 19,407·91 | 51,197·10 | ........ | 149,100·00 | ........ | 277,046·26 | 813,438·79 | 149,100·00 |

| | 1902. | 1903. |
|---|---|---|
| Duty collected, ex-manufactory and ex-warehouse.................. | $ 42,881 40 | $ 43,023 54 |
| " on licenses...... ........................ .......... | 2,425 00 | 2,000 00 |
| Totals.. ............ ............ .... | $ 45,306 40 | $ 45,023 54 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—ACETIC ACID.

### No. 30.—RETURN of Manufactures for the Year ended June 30, 1903.

| DIVISIONS. | LICENSES. | | MANUFACTURED. | PAID DUTY EX-MANUFACTORY. | | WAREHOUSED. | Total Duty collected ex-Manufactory, including License Fees. |
|---|---|---|---|---|---|---|---|
| | No. | Fees. | — | — | Duty. | — | |
| | | | Galls. | Galls. | $ cts. | Galls. | $ cts. |
| Toronto, Ont | 1 | 50 | 213,922·62 | 64,993·22 | 2,599 74 | 148,929·40 | 2,649 74 |
| Montreal, Que | 1 | 50 | 6,434·93 | 2,838·15 | 113 53 | 3,596·78 | 163 53 |
| Totals | 2 | 100 | 220,357·55 | 67,831·37 | 2,713 27 | 152,526·18 | 2,813 27 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## APPENDIX A—*Continued*—ACETIC ACID.

### No. 31.—COMPARATIVE STATEMENT of Manufactures for the Years ended June 30, 1902 and 1903.

| PROVINCES. | LICENSES. | | MANUFACTURED. | PAID DUTY EX-MANUFACTORY. | | WAREHOUSED. | Total Duty collected ex-Manufactory, including License Fees. |
|---|---|---|---|---|---|---|---|
| | No. | Fees. | — | — | Duty. | — | |
| 1902. | | | Galls. | Galls. | $ cts. | Galls. | $ cts. |
| Ontario | 1 | 50 | 145,820·65 | 111,473·10 | 4,458 91 | 34,347·55 | 4,508 91 |
| Quebec | 1 | 50 | 40,649·72 | 21,403·23 | 856 13 | 19,246·49 | 906 13 |
| Totals | 2 | 100 | 186,470·37 | 132,876·33 | 5,315 04 | 53,594·04 | 5,415 04 |
| 1903. | | | | | | | |
| Ontario | 1 | 50 | 213,922·62 | 64,993·22 | 2,599 74 | 148,929·40 | 2,649 74 |
| Quebec | 1 | 50 | 6,434·93 | 2,838·15 | 113 53 | 3,596·78 | 163 53 |
| Totals | 2 | 100 | 220,357·55 | 67,831·37 | 2,713 27 | 152,526·18 | 2,813 27 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## APPENDIX A—*Continued*—ACETIC ACID.

### No. 32.—Warehouse Return for the Year ended June 30, 1903.

Dr. Cr.

| Placed in Warehouse. | Totals. | Divisions. | Entered for Consumption. | Duty. | Exported. | Remaining in Warehouse. | Totals. |
|---|---|---|---|---|---|---|---|
| Galls. | Galls. | | Galls. | $ cts. | Galls. | Galls. | Galls. |
| 148,929·40 | 148,929·40 | ....Toronto, Ont .... ..... | 82,880·86 | 3,315 22 | 4,531·07 | 61,517·47 | 148,929·40 |
| 3,596·78 | 3,596·78 | ...Montreal, Que ........ | ...... ... | .......... | ....... .. | 3,596·78 | 3,596·78 |
| 152,526·18 | 152,526·18 | .......Totals....... ... | 82,880·86 | 3,315 22 | 4,531·07 | 65,114·25 | 152,526·18 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## APPENDIX A—*Continued*—ACETIC ACID.

### No. 33.—Comparative Statement of Warehouse Returns for the Years ended June 30, 1902 and 1903.

Dr, Cr.

| Remaining in Warehouse from last year. | Placed in Warehouse. | Totals. | Provinces. | Entered for Consumption. | Duty. | Exported. | Remaining in Warehouse. | Totals. |
|---|---|---|---|---|---|---|---|---|
| Galls. | Galls. | Galls. | 1902. | Galls. | $ cts. | Galls. | Galls. | Galls. |
| 30,799·16 | 34,347·55 | 65,146·71 | ..Ontario. .... . | 65,146·71 | 2,605 87 | .......... | ..... . .. | 65,146·71 |
| 1,788·40 | 19,246·49 | 21,034·89 | ..Quebec.. ... . | 21,034·89 | 841 40 | ... .. | .... .... | 21,034·89 |
| 32,587·56 | 53,594·04 | 86,181·60 | ....Totals ... | 86,181·60 | 3,447 27 | .. ....... | .......... | 86,181·60 |
| | | | 1903. | | | | | |
| . ....... | 148,929·40 | 148,929·40 | ..Ontario. .... | 82,880 86 | 3,315 22 | 4,531·07 | 61,517·47 | 148,929·40 |
| .......... | 3,596·78 | 3,596·78 | ..Quebec.... .. | .... .. . | ......... | .. .. | 3,596·78 | 3,596·78 |
| .......... | 152,526·18 | 152,526·18 | .. .Totals .... | 82,880 86 | 3,315 22 | 4,531·07 | 65,114·25 | 152,526·18 |

| | 1902. | 1903. |
|---|---|---|
| Total duty collected, ex-manufactory and ex-warehouse.......... | $ 8,762 31 | $ 6,028 49 |
| " on licenses................................ | 100 00 | 100 00 |
| | $ 8,862 31 | $ 6,128 49 |

Inland Revenue Department,
Ottawa, August, 18, 1903.

W. J. GERALD,
*Deputy Minister.*

## APPENDIX A—*Continued*—METHYLATED SPIRITS.

No. 34.—Statement showing the quantity of Raw Materials on hand at beginning and end of year, and brought in and used during the Year 1902-1903.

Dr. (A) Cr.

| Names of Articles | Stock on hand July, 1902. | Brought in during the year. | Total to be Accounted for. | Used in manufacture of Methylated Spirits. | Sold. | Stock on hand June 30, 1903. | Total Accounted for. |
|---|---|---|---|---|---|---|---|
| | Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. |
| Alcohol ..... .. | 6,475·43 | 68,078·92 | 74,554·35 | 69,290·85 | 3·30 | 5,260·20 | 74,554·35 |
| Wood Naphtha. | 8,293·01 | 19,674·87 | 27,967·88 | 25,255·34 | .......... | 2,712·54 | 27,967·88 |

(B)

Statement showing the quantity of Raw Materials used, and Methylated Spirits produced therefrom.

| Alcohol used. Statement (A) above. | Wood Naphtha used. Statement (A) above. | Methylated Spirits used. Statement (C) below. | Total to be Accounted for. | Methylated Spirits produced. | Loss in Manufacture. | | Total Accounted for. |
|---|---|---|---|---|---|---|---|
| Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. | p.c. | Pr'f galls. |
| 69,290·85 | 25,255·34 | ...... .... | 94,546·19 | 92,242·56 | 2,303·63 | 2·44 | 94,546·19 |

(C)

Statement showing the quantity of Methylated Spirits on hand at beginning and end of year, and brought in, sold and otherwise accounted for during the year.

| Stock on hand July 1, 1902. | Manufactured as above. Statement (B) | Brought in during the year. | Total to be Accounted for. | Sold. | Used in Methylated Spirits Warehouse. | Re-used in Manufacture of Methylated Spirits. | Stock on hand June 30, 1903. | Total Accounted for. |
|---|---|---|---|---|---|---|---|---|
| Pr'f. galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f galls. | Pr'f. galls. | Pr'f galls. | Pr'f galls | Pr'f galls |
| 6,213·26 | 92,242·56 | ... .... | 98,455·82 | 94,187·03 | ..... .. | ......... | 4,268·79 | 98,455·82 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

DR. No. 35.—HYDRAULIC and other Rents, &c.,

| Balances due on July 1, 1902. | Rents accrued up to June 30, 1903. | Totals. | Number. | Location. | Original Lessees. | Present Occupants. |
|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | | | | |
| 100 00 | 200 00 | 300 00 | 1 | Ottawa River... | Perley & Pattee......... | J. R. Booth..... ...... |
| 50 00 | 100 00 | 150 00 | 2 | " ... | Thompson & Perkins.... | " ...... ..... |
| 150 00 | 300 00 | 450 00 | 3 | " ... | Lyman Perkins....... . | " .. . .. .. |
| 150 00 | 300 00 | 450 00 | 4 | " ... | R. Blackburn, *et al*...... | McKay Milling Co., Ltd |
| .... ..... | 100 00 | 100 00 | 5 | " ... | J. & J. Petrie..... ... . | Ottawa Electric Co..... |
| .......... | 100 00 | 100 00 | 6 | " ... | A. H. Baldwin ......... | " ....... ... |
| .......... | 300 00 | 300 00 | 7 | " ... | Ottawa Elec. R'way Co.. | .... ........ ... ... |
| .......... | 400 00 | 400 00 | 8 | " ... | Perley & Pattee. .. .... | Ottawa Electric Co..... |
| .... .... | 100 00 | 109 00 | 9 | " ... | J. M. Currier. . .... | N. S. Blaisdell......... |
| ......... | 600 00 | 600 00 | 10 | " .. | Harris, Bronson & Co... | The Bronson & Weston Lumber Co .......... |
| .. ...... | 200 00 | 200 00 | 11 | " ... | Levi Young...... ...... | Ottawa Electric Ry. Co. |
| ......... | 104 00 | 104 00 | 12 | " ... | J. R. Booth .. . ...... | .... ........... .... |
| .......... | 10 00 | 10 00 | 13 | " ... | Bronson & Weston...... | .......... .. ...... ... |
| .......... | 100 00 | 109 00 | 14 | " ... | " ..... | ............... ....... |
| ......... | 96 00 | 96 00 | 15 | " ... | Perley & Pattee........ | J. R. Booth. .. . .... |
| 56 00 | 8 00 | 64 00 | 16 | " ... | L. M. Coutlee.. ........ | Mary Conroy. .. .... |
| 570 00 | ....... | 570 84 | 17 | " ... | John Rochester....... | .. ................ |
| ....... ... | 25 00 | 25 00 | 18 | " ... | Nérée Tétreau . .. .... | Thomas Ahearn ....... |
| 200 00 | .... .... | 200 00 | 19 | " ... | Hon. J. Skead......... | ..... ........ ....... |
| 96 00 | ........ . | 96 00 | 20 | " ... | " ....... .. | ................ . . . |
| .... ..... | 1 00 | 1 00 | 21 | " ... | G. A. Grier & Co.. ... | Ottawa Investment Co.. |
| 380 00 | ........ | 380 00 | 22 | " ... | John Rankin........... | ... .. .... ....... .. |
| 75 00 | 150 00 | 225 00 | 23 | " ... | J. R. Booth....... .... | ... . ...... ....... |
| 55 00 | 5 00 | 60 00 | 24 | " ... | Colin Dewar.... ....... | ... . .. .. ... ... |
| .... .... | 50 00 | 50 00 | 25 | " ... | Bronson & Weston . . | ......... .. . ... .... |
| 1 00 | 1 00 | 2 00 | 26 | " ... | Alfred Desjardins...... | ............ .... .... |
| .......... | 100 00 | 100 00 | 27 | " .. | The Bronson Co. ....... | ............... ...... |
| .......... | 10 00 | 10 00 | 28 | " ... | Ottawa Electric Co...... | .... ..... ..... .. .... |
| .... .. | 1 00 | 1 00 | 1 | St. Lawrence R.. | Que. Har. Commissioners | ... .. ........ .... |
| 100 00 | 25 00 | 125 00 | 2 | " ... | Rich. and Ont. Nav. Co.. | . .. ............... |
| .......... | 1 00 | 1 00 | 3 | Kingston, Ont... | The Frontenac Milling Co., Ltd..... .... ... | . .... .......... ... |
| ......... | 1 00 | 1 00 | 4 | Quebec.......... | Corporation of Quebec, . | .... ........... ... |
| . . ...... | 1 00 | 1 00 | 5 | " ......... | Narcisse Blais...... .... | ..... ..... .. . ....... |
| 5 00 | .......... | 5 00 | 6 | Richibucto Har.. | Wm. Hudson... ........ | ..... .... ....... ... |
| .... .... | 1 00 | 1 00 | 7 | Rondeau Har... | School Trustees......... | ............... ..... |
| ....... ... | 1 00 | 1 00 | 8 | Collingwood Har | Great North'n Transit Co | ... ..... ........... .. |
| .......... | 1 00 | 1 00 | 9 | Ottawa......... | E. G. Laverdure........ | .... ..... ........ .. |
| .......... | 1 00 | 1 00 | 10 | Walkerton, Ont. | D. Rob'tson & J. Rowland | .... .. ......... .. |
| .......... | 1 00 | 1 00 | 11 | Three Rivers.... | Corporation of Three Riv | .............. .... |
| 100 00 | 100 00 | 200 00 | 12 | " ... | W. Ritchie..... .. ..... | .................... |
| 165 09 | ....... . | 165 00 | 13 | British Columbia | A. Peel................. | ......... ........... |
| 90 00 | .......... | 90 00 | 14 | " .. | Jonathan Maury...... . | ............... .... |
| 50 00 | 25 00 | 75 00 | 15 | " .. | Roderick Finlayson..... | .............. ... ... |
| 25 00 | 25 00 | 50 00 | 16 | " .. | Joseph Spratt..... .... | .... ............... |
| .......... | 1 00 | 1 00 | 17 | " .. | Bank of British Columbia | ......... ......... |
| ... . .... | 1 00 | 1 00 | 18 | " .. | W. Dodd.............. | .................. |
| .......... | 12 00 | 12 00 | 19 | " .. | D. W. Gordon .. ..... | .............. ..... |
| . . .... | 5 00 | 5 00 | 20 | " .. | S. Williams..... ....... | .............. .... .... |
| ....... .. | 5 00 | 5 00 | 21 | " .. | Geo. H. Huff.......... | .......... ........ .... |
| ......... . | 1 00 | 1 00 | 22 | " .. | Canadian Pac. Ry. Co... | ..... ...... ..... .. .. |
| ..... .... | 50 00 | 50 00 | 23 | " .. | John Reid............. | .. ......... ... .... |

Lessees' Accounts, 1902–1903. CR.

| Description of Property. | Number. | Date to which Account is made up. | Abatement. | Paid during Fiscal Year. | Balances due on June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|
| | | | | $ cts. | $ cts. | $ cts. |
| Lots B and C, Chaudière St., service ground | 1 | June30, 1903 | | 200 00 | 100 00 | 300 00 |
| Lot D | 2 | ″ 30, 1903 | | 100 00 | 50 00 | 150 00 |
| Lots E, F and G, South Head St | 3 | ″ 30, 1903 | | 300 00 | 150 00 | 450 00 |
| Lots H, I and J, grist mill, North Head St | 4 | ″ 30, 1903 | | 300 00 | 150 00 | 450 00 |
| Lot K, fanning mill, South Head St | 5 | Dec. 31, 1902 | | 100 00 | | 100 00 |
| Lot L, service ground | 6 | ″ 31, 1902 | | 100 00 | | 100 00 |
| Lots Q, R and T, service ground, North Middle St | 7 | ″ 31, 1902 | | 300 00 | | 300 00 |
| Lots M, N, O and P, service ground (no water used) | 8 | ″ 31, 1902 | | 400 00 | | 400 00 |
| Lot S, service ground | 9 | June30, 1903 | | 100 00 | | 100 00 |
| Lots U, V, W, X, Y and Z, service ground | 10 | ″ 30, 1903 | | 600 00 | | 600 00 |
| Two strips of land | 11 | Jan. 1, 1904 | | 200 00 | | 200 00 |
| Lumber yard at head of slides | 12 | Sept.20, 1904 | | 104 00 | | 104 00 |
| Bridge over slides | 13 | June30, 1904 | | 10 00 | | 10 00 |
| Strip of land, Amelia Island | 14 | Jan. 1, 1904 | | 100 00 | | 100 00 |
| Reserve, head of Chaudière Island | 15 | ″ 1, 1904 | | 100 00 | | 96 00 |
| Small island, Deschênes Rapids | 16 | ″ 1, 1903 | | | 64 00 | 64 00 |
| Portion of lot 39, Concession 'A,' Nepean | 17 | Feb. 1, 1885 | | | 570 84 | 570 84 |
| Excavated channel slide and two dams, Little Chaudière | 18 | Mar. 1, 1904 | | 25 00 | | 25 00 |
| Water lots opposite lot 30, Concession 'A,' Nepean | 19 | Dec. 1, 1891 | | | 200 00 | 200 00 |
| Three small islands, Ottawa River | 20 | May 1, 1891 | | | 96 00 | 96 00 |
| Covering over portion of Ottawa slides | 21 | Nov. 10, 1903 | | 1 00 | | 1 00 |
| East portion of Hawley's Island | 22 | June30, 1891 | | | 380 00 | 380 00 |
| Piece of land, south-west end of Union Bridge | 23 | Nov.12, 1903 | | 150 00 | 75 00 | 225 00 |
| Piece of land on Victoria Island | 24 | June15, 1904 | | | 60 00 | 60 00 |
| Piece of land, south side of Middle St., Victoria Island | 25 | Aug.31, 1903 | | 50 00 | | 50 00 |
| Piece of land, Longue Pointe Rouge Templeton, Ottawa County | 26 | Oct. 24, 1903 | | 2 00 | | 2 00 |
| South-west of lot No. 1, Amelia Island | 27 | ″ 9, 1902 | | 100 00 | | 100 00 |
| Lot Pa., South Head St | 28 | Jan. 10, 1904 | | 10 00 | | 10 00 |
| Small lot near Custom House, Quebec | 1 | Sept. 1, 1903 | | 1 00 | | 1 00 |
| Roadway from pier at Coteau Landing | 2 | July 1, 1903 | | | 125 00 | 125 00 |
| Portion of the Graving Dock, Gore St., Ont | 3 | May 31, 1904 | | 1 00 | | 1 00 |
| Old Provincial Government Building grounds, on Mountain Hill | 4 | June25, 1904 | | 1 00 | | 1 00 |
| Privilege to erect bridge on St. Charles River | 5 | Feb. 6, 1904 | | 1 00 | | 1 00 |
| Piece of land at North Beach | 6 | June30, 1903 | | | 5 00 | 5 00 |
| Use of old log house formerly used as Custom House, Shrewsbury, Ont | 7 | Sept.11, 1902 | | 1 00 | | 1 00 |
| Use of breakwater for storing coal | 8 | Feb. 5, 1904 | | 1 00 | | 1 00 |
| South-east half of lot 8, Ottawa | 9 | Dec. 18, 1903 | | 1 00 | | 1 00 |
| Right of way over strip of land | 10 | Apl. 27, 1904 | | 1 00 | | 1 00 |
| Lot of land on St. Christopher Island, St. Maurice River | 11 | Dec. 1, 1903 | | 1 00 | | 1 00 |
| Outlet of River St. Maurice | 12 | June30, 1903 | | 100 00 | 100 00 | 200 00 |
| Portion of Assay Office, New Westminster | 13 | June11, 1891 | | | 165 00 | 165 00 |
| ″ ″ ″ | 14 | ″ 11, 1891 | | | 90 00 | 90 00 |
| Privilege to erect two bulkheads, Rock Bay, Victoria Harbour | 15 | ″ 1, 1904 | | | 75 00 | 75 00 |
| Privilege to build a wharf opposite his own property, Victoria Harbour | 16 | ″ 1, 1904 | | 25 00 | 25 00 | 50 00 |
| Right of drainage through Government property, Nanaimo | 17 | Dec. 1, 1903 | | 1 00 | | 1 00 |
| Old Government House, Yale | 18 | July 24, 1902 | | 1 00 | | 1 00 |
| Beach lots A, C, E and F, front of 7, 8 and 9, Nanaimo Harbour | 19 | Aug.27, 1903 | | 12 00 | | 12 00 |
| Frontage on lot 7, block M, Victoria | 20 | July 16, 1903 | | | 5 00 | 5 00 |
| Permission to build a wharf on lot A, block 2, Somas River, Alberni, B.C | 21 | Aug.12, 1903 | | | 5 00 | 5 00 |
| Portion of Custom House lot, New Westminster | 22 | Apl. 14, 1904 | | 1 00 | | 1 00 |
| Lot 1, block 13, corner Begbie and Columbia Sts., New Westminster | 23 | May 12, 1904 | | 50 00 | | 50 00 |

Dr. No. 35.—Hydraulic and other Rents, &c.,

| Balances due on July 1, 1902. | Rents accrued up to June 30, 1903. | Totals. | Number. | Location. | Original Lessees. | Present Occupants. |
|---|---|---|---|---|---|---|
| $ cts. | $ cts. | $ cts. | | | | |
| 70 00 | .......... | 70 00 | 24 | Rivière du Lièvre. | Dominion Phosphate Co., Ltd. ... ........ | .. .............. |
| 1 00 | .... ..... | 1 00 | 25 | Charlottetown.... | Rt. Rev. Bishop McIntyre | Rt. Rev. Bishop McDonald. ...... .. .. . |
| 20 00 | .......... | 20 00 | 26 | Rivière St. Maurice. ........... | Laurentides Pulp Co., Ltd | .... .. ... ... . ... |
| .......... | 16 00 | 16 00 | 27 | Antigonish, N.S. | L. C. Archibald..... ... | ............ ........ |
| 1 00 | 1 00 | 2 00 | 28 | Owen Sound...... | Grand Trunk Railway... | ............ .... .... |
| .......... | 5 00 | 5 00 | 29 | ........ ... .... | Jacob Duke Speers .... | .............. .. |
| 240 00 | .... .. . | 240 00 | 30 | Windsor ......... | Archie McNee ......... | ........ .. ... ... |
| .......... | 1 00 | 1 00 | 31 | Lévis, Quebec.... | Cyrille Robitaille .. .... | .. . ..... .... ..... |
| ......... | 1 00 | 1 00 | 32 | Port Morien, N.S. | The Gourie & Blackhouse Collieries, Ltd........ | ..... ..... ......... |
| .......... | 5 00 | 5 00 | 33 | Bayfield, N.S..... | Charles L. Gass......... | ................. ... |
| 1 00 | 1 00 | 2 0 | 34 | " .... | " ......... | .. ............ ...... |
| ... ..... | 5 00 | 5 00 | 35 | Village of Brooke, Ont............ | Pedwell, William. ... | .... ............... |
| 2,751 84 | 3,654 00 | 6,405 84 | | | | |

Inland Revenue Department,
Ottawa, August 18, 1903.

Lessee's Accounts, 1902-1903—*Concluded.*

| Description of Property. | Number. | Date to which Account is made up. | Abatements. | Paid during Fiscal Year. | Balances due on June 30, 1903. | Totals. |
|---|---|---|---|---|---|---|
| | | | | $ cts. | $ cts. | $ cts. |
| Permission to erect a landing at Little Rapids, Rivière du Lièvre | 24 | Apl. 30, 1898 | .... | ....... | 70 00 | 70 00 |
| Leave to connect drain to main service of pub. build'g | 25 | May 16, 1902 | ..... | ....... | 1 00 | 1 00 |
| Tract of land, Chûte de la Grande Mère, St. Maurice River | 26 | June 17, 1903 | 20 00 | ....... | ....... | 20 00 |
| Tract of land and water lot, McNair's Cove | 27 | Dec. 30, 1903 | .... | 16 00 | ....... | 16 00 |
| Lot of land west of Sydenham River | 28 | " 31, 1903 | ..... | 2 00 | ....... | 2 00 |
| Water lot | 29 | Apl. 8, 1904 | ..... | 5 00 | ....... | 5 00 |
| Lot on Ouellette St., Windsor, Ont. | 30 | " 30, 1900 | ..... | ....... | 240 00 | 240 00 |
| Ground rent | 31 | " 4, 1904 | ..... | 1 00 | ....... | 1 00 |
| Water lot for the purpose of constructing a pier | 32 | Dec. 20, 1903 | ..... | 1 00 | ....... | 1 00 |
| Water lot | 33 | " 7, 1903 | ..... | 5 00 | ....... | 5 00 |
| " | 34 | June 8, 1904 | ..... | 2 00 | ....... | 2 00 |
| " | 35 | Mar. 31, 1904 | ..... | 5 00 | ....... | 5 00 |
| Grand Totals | .. | ............ | 20 00 | 3,584 00 | 2,801 84 | 6,405 84 |

W. J. GERALD,
*Deputy Minister.*

APPENDIX

No. 35 (A).—HYDRAULIC and other Rents, &c.—

| Balances due on July 1, 1902. | Totals. | Number. | Location. | Name of Proprietors. |
|---|---|---|---|---|
| $ cts. | $ cts. | | | LAND SALES—PRINCIPAL ACCOUNT. |
| 12,092 83 | 12,092 83 | 1 | Hamilton and Port Dover Road.. | Choat & Kern.................. ..... |
| 433 34 | 433 34 | 2 | Bonner's property, Quebec....... | Timothy Sullivan, now M. Murphy.. |
| 333 34 | 333 34 | 3 | ........ ... ...... ........ ... | John Bailey, now Alex. Powell.. .. |
| 300 00 | 300 00 | 4 | .. .................................. | Abraham Thompson................ |
| 147 80 | 147 80 | 5 | .................... ..... ... | John Boomer...... . ...... ....... |
| 248 40 | 248 40 | 6 | ... .... ....... . . ....... | John Garbatz, now J. C. Nolan...... |
| 154 80 | 154 80 | 7 | ........ ..... ................ | N. H. Bowen......... ... ......... |
| 600 00 | 600 00 | 8 | ... ........... ...... ...... ..... | Estate Robert Reid... ... ......... |
| 333 33 | 333 33 | 9 | ............... . .............. | John Chevalier ... . .............. |
| 533 33 | 533 33 | 10 | ........ ... ................... | Daniel Holden ... ............... |
| 333 33 | 333 33 | 11 | ................................ | George Creeley . ... ....... ....... |
| 63 00 | 63 00 | 12 | .......................... ........ | Thomas McAdam.............. .... |
| 15,573 50 | 15,573 50 | | | |
| | | | | LAND SALES—INTEREST ACCOUNT. |
| 6,298 25 | 6,298 25 | 1 | Hamilton and Port Dover Road.. | Choat & Kern (matured)........ .... |
| 558 00 | 558 00 | 2 | Bonner's property, Quebec...... | Timothy Sullivan, now M. Murphy.. |
| 120 00 | 120 00 | 3 | ....................... ...... ..... | John Bailey, now Alex. Powell .. . |
| 306 00 | 306 00 | 4 | .. .. ...... .. ............... | Abraham Thompson...... . ........ |
| 155 22 | 155 22 | 5 | .................. .. . ........ | John Boomer... ........ .......... |
| 275 82 | 275 82 | 6 | ................ ... ... ......... | John Garbatz, now J. C. Nolan.. ... |
| 208 95 | 208 95 | 7 | ....... ........ .. .......... .. | N. H. Bowen........................ |
| 828 00 | 828 00 | 8 | ..................... ........ . | Estate Robert Reid.................. |
| 190 00 | 190 00 | 9 | ................... ... ........ | John Chevalier.......... ... ... . |
| 298 68 | 298 68 | 10 | .......... . ..................... | Daniel Holden ...... ......... .... |
| 35 91 | 35 91 | 11 | ... ........ ..... ............... | George Creeley ................... |
| 100 00 | 100 00 | 12 | ............ . ...... ... ... . | Thomas McAdam................... |
| 100 00 | 100 00 | 13 | .... ... ..... . ........ ...... | Joseph Brook, tenant ..... .... .... |
| 9,474 83 | 9,474 83 | | | |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

A—*Concluded.*

Lessees' Accounts, 1902-1903—*Concluded.*

| Description of Property. | Number. | Date to which the account is made up. | Balances due on June 30, 1903. | Totals. |
|---|---|---|---|---|
| | | | $ cts. | $ cts. |
| Hamilton and Port Dover & Caledonia Bridge | 1 | | 12,092 83 | 12,092 83 |
| Lot No. 1, Wolfe Street | 2 | | 433 34 | 433 34 |
| " 9 " | 3 | | 333 34 | 333 34 |
| " 49 " | 4 | | 300 00 | 300 00 |
| " 73 and 74, Tower Street | 5 | | 147 80 | 147 80 |
| " 64 Wolfe Street and 211 and 252 Ware Street | 6 | | 248 40 | 248 40 |
| " 67 and 68, Monument Street | 7 | | 154 80 | 154 80 |
| " 22 and 23, Wolfe Street | 8 | | 600 00 | 600 00 |
| " 32, Wolfe Street | 9 | | 333 33 | 333 33 |
| " 65 and 66, Wolfe Street | 10 | | 533 33 | 533 33 |
| " 31, Wolfe Street | 11 | | 333 33 | 333 33 |
| " 135, Church Street | 12 | | 63 00 | 63 00 |
| | | | 15,573 50 | 15,573 50 |
| | 1 | June 30, 1874 | 6,298 25 | 6,298 25 |
| Lot No. 1, Wolfe Street | 2 | May 1, 1889 | 558 00 | 558 00 |
| " 9 " | 3 | " | 120 00 | 120 00 |
| " 49 " | 4 | " | 306 00 | 306 00 |
| " 73 and 74, Tower Street | 5 | " | 155 22 | 155 22 |
| " 64, Wolfe Street, and 211 and 252 Ware Street | 6 | " | 275 82 | 275 82 |
| " 67 and 68, Monument Street | 7 | " | 208 95 | 208 95 |
| " 22 and 23, Wolfe Street | 8 | " | 828 00 | 828 00 |
| " 32, Wolfe Street | 9 | Nov. 1, 1863 | 190 00 | 190 00 |
| " 65 and 66, Wolfe Street | 10 | " | 298 68 | 298 68 |
| " 31, Wolfe Street | 11 | " | 35 91 | 35 91 |
| " 135, Church Street | 12 | " | 100 00 | 100 00 |
| Monument Hotel | 13 | " | 100 00 | 100 00 |
| | | | 9,474 83 | 9,474 83 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX B.

### No. 1.—Details of Excise Expenditures for the year ended June 30, 1903.

| To whom paid. | Service. | Deductions for |  |  | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
|  |  | Retirement. | Superannuation. | Guarantee |  |  |
|  | *Belleville.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Ber, B. | Salary as Collector for year |  | 36 00 | 7 20 | 1,756 80 |  |
| Standish, J. G. | ″ Special Class Exciseman for year |  | 30 00 | 4 32 | 1,465 68 |  |
| Pole, C. W. | ″ Deputy Collector for year. |  | 28 64 | 3 60 | 1,397 76 |  |
| McCoy, W. | ″ Special Class Exciseman for year |  | 24 00 | 4 32 | 1,171 68 |  |
| McCuaig, A. F. | ″ Deputy Collector for year. |  | 17 44 | 2 88 | 818 62 |  |
| McFee, A. F. | ″ 2nd Class Exciseman ″ |  | 27 54 | 2 88 | 757 08 |  |
| Brown, W. J. | ″ ″ ″ ″ | 34 26 |  | 2 88 | 649 08 |  |
|  | Salaries | 34 26 | 163 62 | 28 08 | 8,016 70 |  |
|  | Contingencies |  |  |  | 378 73 |  |
|  |  |  |  |  |  | 8,395 43 |
|  | *Brantford.* |  |  |  |  |  |
| Sinon, E. H. | Salary as Collector for year |  | 30 42 | 7 20 | 1,484 88 |  |
| Sloan, W. | ″ Deputy Collector for year. | 59 85 |  | 3 60 | 1,132 80 |  |
| Walsh, D. J. | ″ Special Class Exciseman, from 1 to July 31, 1902. |  | 2 00 | 0 36 | 97 64 |  |
| Weyms, C. | ″ 1st class exciseman for year |  | 19 96 | 2 88 | 977 16 |  |
| Bell, J. E. | ″ 1st ″ ″ |  | 19 96 | 2 88 | 977 16 |  |
| Orr, H. N. | ″ 1st ″ ″ |  | 33 45 | 2 88 | 919 92 |  |
| Hart, P. D | ″ 2nd ″ ″ |  | 16 96 | 2 88 | 830 16 |  |
| Berry, H. L | ″ 1st ″ ″ | 42 52 |  | 2 88 | 804 60 |  |
| Hawkins, A.C. | ″ 1st ″ from Sept 1, 1902 to June 30, 1903 |  | 16 60 | 2 40 | 814 30 |  |
|  | Salaries | 162 37 | 139 35 | 27 96 | 8,038 62 |  |
|  | Contingencies |  |  |  | 449 79 |  |
|  |  |  |  |  |  | 8,488 41 |
|  | *Cornwall.* |  |  |  |  |  |
| Mulhern, M.M | Salary as Collector for year |  | 20 00 | 3 60 | 976 40 |  |
|  | Contingencies |  |  |  | 101 40 |  |
|  | *Guelph.* |  |  |  |  | 1,077 80 |
| Powell, J.B. | Salary as Collector for year |  | 41 40 | 7 20 | 2,021 40 |  |
| Till, T. M. | ″ Deputy Collector for year. |  | 29 92 | 3 60 | 1,461 48 |  |
| Dawson, W. | ″ Special Class Exciseman for year |  | 30 00 | 4 32 | 1,465 68 |  |
| Woodward, G.W. | ″ ″ ″ |  | 24 00 | 4 32 | 1,171 68 |  |
| Broadfoot, S. | ″ Accountant ″ |  | 22 04 | 4 32 | 1,073 64 |  |
| Bish, P. | ″ 1st class exciseman for year |  | 19 96 | 2 88 | 977 16 |  |
| Spence, F. H. | ″ 1st ″ ″ |  | 19 96 | 2 88 | 9 7 16 |  |
| Bowman, A | ″ 1st ″ ″ |  | 19 96 | 2 88 | 977 16 |  |
| O'Donoghue, M. J. | ″ 1st ″ ″ |  | 19 96 | 2 88 | 977 16 |  |
| Kilroy, E. T. | ″ 1st ″ ″ |  | 19 96 | 2 88 | 977 16 |  |
| Brain, A. F. | ″ 1st ″ ″ |  | 34 30 | 2 88 | 940 32 |  |
| O'Brien, E. C. | ″ 2nd ″ ″ |  | 16 96 | 2 88 | 830 16 |  |
| Alteman, P. J | ″ 1st ″ ″ |  | 29 68 | 2 88 | 817 44 |  |
| Howie, A | ″ 3rd ″ ″ |  | 15 00 | 2 88 | 732 12 |  |
| Coutts, J. J | ″ 2nd ″ ″ | 34 26 |  | 2 88 | 649 08 |  |
|  | Salaries | 34 26 | 343 10 | 52 56 | 16,048 80 |  |
|  | Contingencies |  |  |  | 958 67 |  |
|  |  |  |  |  |  | 17,007 47 |

APPENDIX B.—No. 1.—Details of Excise Expenditures, &c., 1902 1903—*Continued.*

| To whom paid. | Service. | Deductions for | | | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | Retirement. | Superannuation. | Guarantee. | | |
| | *Hamilton.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Miller, W. F. | Salary as Collector for year | | 43 96 | 14 40 | 2,141 64 | |
| Cameron, D. M. | " Special Class Exciseman for year | | 30 00 | 4 32 | 1,465 68 | |
| Baby, W. A. D. | " " " | | 30 00 | 4 32 | 1,465 68 | |
| Donaghy, W. | " " " | | 28 04 | 4 32 | 1,367 64 | |
| O'Brien, Jas | " Deputy Collector for year. | 67 39 | | 7 20 | 1,274 16 | |
| Crawford, W. P | " Accountant " | | 25 44 | 4 32 | 1,245 24 | |
| O'Brien, J. F. | " 1st class exciseman for year | | 19 96 | 2 88 | 977 16 | |
| Irwin, R. | " 1st " " | | 19 96 | 2 88 | 977 16 | |
| Dumbrille, R. W. | " 1st " " | | 19 96 | 2 88 | 977 16 | |
| Weir, J. | " 1st class exciseman from July 1 to Dec. 31, 1902. | | 9 96 | 1 44 | 488 58 | |
| Hobbs, G. N. | " 1st class exciseman for year | | 19 96 | 2 88 | 977 16 | |
| Wardell, R.S.R. | " 1st " " | | 34 96 | 2 88 | 962 16 | |
| Hayhurst, T. H | " 1st " " | 44 58 | | 2 88 | 845 04 | |
| Logan, J. | " 2nd " " | | 16 96 | 2 88 | 830 16 | |
| Amor, W. | " 2nd " " | | 16 96 | 2 88 | 830 16 | |
| Bishop, J. B. | " 3rd class, from July 1, to Dec. 31, 1902. 2nd class, from Jan. 1 to June 30, 1903 | 35 94 | | 2 88 | 681 18 | |
| Cheseldine, J. H. | " " " | 34 26 | | 2 88 | 649 08 | |
| Lawlor, J. J. | " " " | 34 26 | | 2 88 | 649 08 | |
| Blackman, C. | " Messenger for year. | 28 04 | | | 531 96 | |
| Brennan, D. J. | " 1st class exciseman from Jan. 1 to June 30, 1903 | | 9 98 | 1 44 | 488 58 | |
| | Salaries | 244 47 | 326 10 | 73 44 | 19,824 66 | |
| | Contingencies | | | | 376 23 | |
| | | | | | | 20,300 89 |
| | *Kingston.* | | | | | |
| Dickson, C. T. | Salary as Collector for year | | 31 96 | 7 20 | 1,560 84 | |
| Grimason, T. | " Deputy Collector for year. | | 24 00 | 3 60 | 1,172 40 | |
| Hanley, A. | " Accountant for year. | | 19 96 | 2 88 | 977 16 | |
| McFarland, C. D. | " 1st class exciseman for year | | 19 96 | 2 88 | 977 16 | |
| Lyons, E. | " 1st " " | | 19 96 | 2 88 | 977 16 | |
| O'Donnell, J. | " Messenger for year. | | 15 00 | 2 88 | 732 12 | |
| Fahey, E. | " 3rd class exciseman for year | | 13 80 | 2 88 | 673 32 | |
| | Salaries | | 144 64 | 25 20 | 7,070 16 | |
| | Contingencies | | | | 1,303 19 | |
| | | | | | | 8,403 35 |
| | *London.* | | | | | |
| Alexander, T. | Salary as Collector for year | | 41 40 | 7 20 | 2,021 40 | |
| Spereman, J. J | " Special Class Exciseman for year | | 31 96 | 4 32 | 1,563 72 | |
| Davis, T. G. | " Deputy Collector for year. | | 30 00 | 3 60 | 1,466 40 | |
| Trasher, W. A. | " " " | 75 00 | | 3 60 | 1,421 40 | |
| Coles, F. H | " Accountant " | | 22 04 | 4 32 | 1,073 64 | |
| Wilson, D. | " " " | | 21 00 | 2 88 | 1,026 12 | |
| Hicks, W. H. | " Deputy Collector " | | 19 96 | 2 88 | 977 16 | |
| Stewart, J. | " 1st class exciseman for year | | 19 96 | 2 88 | 977 16 | |
| Lee, E. | " 1st " " | | 19 96 | 2 88 | 977 16 | |
| Girard, I | " 1st " " | | 19 96 | 2 88 | 977 16 | |
| Boyle, P. | " 1st " " | (Ins.)<br>71 76 | 29 92 | 2 88 | 895 44 | |
| Davis, Jas. | " 1st " " | | 18 49 | 2 88 | 903 00 | |
| Foster, H | " 1st " " | | 31 26 | 2 88 | 858 36 | |

Appendix B.—No. 1.—Details of Excise Expenditures, &c., 1902-1903—*Continued.*

| To whom paid. | Service. | Deductions for | | | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | Retirement. | Superannuation. | Guarantee. | | |
| | *London*—Con. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Webbe, C. E. A. | Salary as 2nd class exciseman for year | ... | 16 96 | 2 88 | 830 16 | |
| Tracy, J. P. | " 2nd " " | .. | 16 96 | 2 88 | 830 16 | |
| Talbot, J. | " 3rd " " | 36 00 | ....... | 2 88 | 681 12 | |
| Whitehead, J. P. | " Deputy Collector " | 32 48 | ....... | 2 88 | 614 64 | |
| | Salaries | 215 24 | 339 83 | 57 60 | 18,094 20 | |
| | Contingencies | ..... | ..... | ..... | 1,293 25 | |
| | | | | | | 19,387 45 |
| | *Ottawa.* | | | | | |
| Freeland, A. | Salary as Collector for year | 73 44 | ....... | 7 20 | 1,389 36 | |
| McGuire, T. | " Deputy Collector for year. | 60 00 | ....... | 3 60 | 1,136 40 | |
| Slattery, R. | " 1st Class Exciseman " | ... | 19 96 | 2 88 | 977 16 | |
| Bennett, Jas. | " Deputy Collector " | 45 00 | ....... | 2 88 | 852 12 | |
| Hinchey, E. H. | " Accountant " | ..... | 17 40 | 4 32 | 848 28 | |
| Laporte, G. | " 3rd class Exciseman from July 1, 1902 to June 2, 1903, Deputy Collector, Class B, from June 3, to June 30, 1903 | ..... | 15 58 | 2 88 | 761 89 | |
| Fox, T. | " 1st Class Exciseman, Aug. 1, 1902, to June 30, 1903. | ..... | 18 26 | 2 64 | 895 73 | |
| Casey, John | " Probationary Exciseman from Apl. 1, to June 30, 1903 | 6 24 | ....... | 0 72 | 118 02 | |
| | Salaries | 184 68 | 71 20 | 27 12 | 6,978 96 | |
| | Contingencies | ... | ....... | ....... | 140 59 | |
| | | | | | | 7,119 55 |
| | *Owen Sound.* | | | | | |
| Graham, W. J. | Salary as Collector for year | .... | 26 40 | 3 60 | 1,290 00 | |
| Nichols, J. T. | " Deputy Collector for year. | ...... | 19 96 | 2 88 | 977 16 | |
| Johnson, J. J | " 1st Class Exciseman " | ..... | 18 68 | 2 88 | 913 44 | |
| Chisholm, W. N. | " Deputy Collector " | .. | 19 04 | 3 24 | 927 72 | |
| Blyth, A. | " 2nd Class Exciseman for year | 39 42 | ....... | 2 88 | 745 20 | |
| | Salaries | 39 42 | 84 08 | 15 48 | 4,853 52 | |
| | Contingencies | ...... | ....... | ....... | 643 88 | |
| | | | | | | 5,497 40 |
| | *Perth.* | | | | | |
| McLenaghan, N. | Salary as Collector for year | 70 04 | ....... | 7 20 | 1,322 76 | |
| Mason, F. | " Special Class Exciseman for year | ..... | 30 00 | 4 32 | 1,465 68 | |
| Goodman, A. W. | " 1st Class Exciseman for year | ..... | 19 96 | 2 88 | 977 16 | |
| Noonan, H. T. | " Deputy Collector for year | 34 44 | ....... | 3 60 | 651 96 | |
| Clarke, T. | " " " | 34 96 | ....... | 2 88 | 662 16 | |
| Rowan, W. E. | " " " | 25 04 | ....... | 2 88 | 472 08 | |
| Egan, W. | " " " | .. | ....... | 2 88 | 397 08 | |
| Baikie, D. | " " " | 21 36 | ....... | 3 60 | 402 76 | |
| George, J. | " " " | 10 04 | ....... | 2 88 | 187 08 | |
| Maurice, E. | " " " | 8 14 | ....... | 2 88 | 152 79 | |
| Cram, J. W | " from Feb. 4, to Apl. 1, 1903 | 0 78 | ....... | 0 48 | 14 50 | |
| Murphy, J. L. | " from June 1, to June 30, 1903 | 0 42 | ....... | 0 24 | 7 67 | |
| | Salaries | 205 22 | 49 96 | 36 72 | 6,713 68 | |
| | Contingencies | ... | ....... | ....... | 606 59 | |
| | | | | | | 7,320 27 |

## APPENDIX B.—No. 1.—Details of Excise Expenditures, &c., 1902-1903—*Continued.*

| To whom paid. | Service. | Deductions for. | | | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | Retirement. | Superannuation. | Guarantee. | | |
| | *Peterborough.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Rudkins, W | Salary as Collector for year | 53 68 | | 3 60 | 1,017 72 | |
| Rork, T | " Deputy Collector for year. | 42 00 | | 3 60 | 794 40 | |
| Howden, R | " " " | | 16 04 | 2 88 | 781 08 | |
| Bickle, J. W | " " " | | 13 96 | 2 88 | 683 16 | |
| | Salaries | 95 68 | 30 00 | 12 96 | 3,276 36 | |
| | Contingencies | | | | 234 61 | |
| | | | | | | 3,510 97 |
| | *Port Arthur.* | | | | | |
| Ironside, G. A. | Salary as Collector for year | | 19 96 | 3 60 | 976 44 | |
| Robinson, R. S | " Deputy Collector for year. | 7 44 | | 1 80 | 140 76 | |
| | Salaries | 7 44 | 19 96 | 5 40 | 1,117 20 | |
| | Contingencies | | | | 153 54 | |
| | | | | | | 1,270 74 |
| | *Prescott.* | | | | | |
| Keilty, T. | Salary as Acting Collector for year. | | 25 96 | 3 60 | 1,270 44 | |
| Gerald, W. H | " Special Class Exciseman for year | | 30 00 | 4 32 | 1,465 68 | |
| Macdonald, A. B | " " " | | 24 00 | 4 32 | 1,171 68 | |
| Keeler, G. S | " 2nd Class Exciseman for year | | 16 96 | 2 88 | 830 16 | |
| Wood, J. A | " " " | | | 2 88 | 847 08 | |
| Ferguson J. | " 3rd " " | | 15 00 | 2 88 | 732 12 | |
| Johnston, G. E | " 3rd " " | | 15 00 | 2 88 | 732 12 | |
| White, J. B | " Deputy Collector | 30 00 | | 2 88 | 567 12 | |
| Marshall, I. N | " 3rd Class Exciseman for year | 27 48 | | 2 64 | 519 84 | |
| | Salaries | 57 48 | 126 92 | 29 28 | 8,136 24 | |
| | Contingencies. | | | | 499 05 | |
| | | | | | | 8,635 29 |
| | *St. Catharines.* | | | | | |
| Hesson, C. A. | Salary as Collector for year | | 24 00 | 7 20 | 1,168 80 | |
| Harris, J. G | " Deputy Collector for year | | 34 96 | 2 88 | 962 16 | |
| Milliken, E | " 2nd Class Exciseman for year | | 16 96 | 2 88 | 830 16 | |
| Schram, R. L. H | " Deputy Collector for year | | 26 16 | 2 88 | 720 96 | |
| Simpson, W. A | " 3rd Class Exciseman for year | 31 14 | | 2 88 | 588 48 | |
| | Salaries | 31 14 | 102 08 | 18 72 | 4,270 56 | |
| | Contingencies | | | | 373 14 | |
| | | | | | | 4,643 70 |
| | *Stratford.* | | | | | |
| Caven, A. | Salary as Collector for year | | 31 96 | 3 60 | 1,564 44 | |
| Rennie, G | " Deputy Collector for year | | 24 00 | 3 60 | 1,172 40 | |
| Clark, A. F | " Accountant | | 19 96 | 4 32 | 975 72 | |
| Egener, A | " 1st Class Exciseman for year | | 19 96 | 2 88 | 977 16 | |
| Waller, J | " 3rd " " | | 15 00 | 2 88 | 732 12 | |
| Young, R. E. | " 3rd Class Exciseman from July 1 to Dec. 31, 1902 and 2nd Class from Jan. 1 to June 30, 1903 | 33 72 | | 2 88 | 638 40 | |
| | Salaries | 33 72 | 110 88 | 20 16 | 6,060 24 | |
| | Contingencies | | | | 426 26 | |
| | | | | | | 6,486 50 |

APPENDIX B.—No. 1.—Details of Excise Expenditures, &c., 1902–1903—*Continued.*

| To whom paid. | Service. | Deductions for | | | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | Retirement. | Superannuation. | Guarantee. | | |
| | *Toronto.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Frankland, H. R. | Salary as Collector for year | 101 16 | ..... | 14 40 | 1,909 44 | |
| Gerald, C. | " Special Class Exciseman for year | ..... | 31 96 | 4 32 | 1,563 72 | |
| Boomer, J. B. | " Accountant for year | | 28 04 | 4 32 | 1,367 64 | |
| Mackenzie, J. H | " Deputy Collector for year | 64 96 | ....... | 3 60 | 1,231 44 | |
| Metcalf, W. F | " Special Class Exciseman for year | ..... | 24 00 | 4 32 | 1,171 68 | |
| Boyd, S. I. | " Deputy Collector for year | ...... | 24 00 | 2 88 | 1,173 12 | |
| Dick, J. W. | " Special Class Exciseman for year | . . | 24 00 | 4 32 | 1,171 68 | |
| Evans, G. T. | " " " | .. . | 24 00 | 4 32 | 1,171 68 | |
| Jamieson, R. C. | " " " | ..... | 24 00 | 4 32 | 1,171 68 | |
| Shanacy, M. | " Deputy Collector for year | . . | 22 04 | 2 88 | 1,075 08 | |
| Blair, J. B. | " 1st Class Exciseman from July 1 to Oct. 1, 1902. | . .... | 4 98 | 1 08 | 243 93 | |
| Dudley, W. H. | " 1st Class Ex'man for year. | ... | 19 96 | 4 32 | 975 72 | |
| Coleman, C. | " Deputy Collector for year | .... | 19 96 | 2 88 | 977 16 | |
| Helliwell, H. N. | " 1st Class Ex'man for year. | ..... | 19 96 | 2 88 | 977 16 | |
| O'Leary, T. J | " " " | .... | 19 96 | 2 88 | 977 16 | |
| Flynn, D. J | " " " | ...... | 19 96 | 2 88 | 977 16 | |
| Graham, W. T. | " " " | ...... | 19 96 | 2 88 | 977 16 | |
| Doyle, B. J | " " " | ..... | 19 96 | 2 88 | 977 16 | |
| Brennan, D. J | " 1st Class Exciseman from July 1 to Dec. 31, 1902. | .... | 9 96 | 1 44 | 488 58 | |
| Cook, W. R. | " 1st Class Ex'man for year. | ..... | 19 96 | 2 88 | 977 16 | |
| Howard, W. W. S. | " " " | .. ... | 19 96 | 2 88 | 977 16 | |
| Hawkins, A. C. | " 1st Class Exciseman from July 1 to Aug. 31, 1902. | ... | 3 32 | 0 48 | 162 86 | |
| Hurst, L. B. | " 1st Class Exciseman for year | ... .. | 19 96 | 2 88 | 977 16 | |
| Barber, J. S. | " 2nd " " | ....... | 16 96 | 2 88 | 830 16 | |
| Murray, A. E. | " 2nd " " | ...... | 16 96 | 2 88 | 830 16 | |
| Dager, H. J | " 2nd " " | 45 00 | ...... .. | 2 88 | 852 12 | |
| Brentnall, F. F. | " Deputy Collector for year. | 40 04 | .... ... | 2 88 | 757 08 | |
| Boyd, J. F. S. | " 3rd Class Exciseman from July 1 to Dec. 31. 1902, and 1st Class Exciseman from Jan. 1 to June 30, 1903 | ...... | 28 56 | 2 88 | 787 26 | |
| Coulter, A. | " 1st Class Ex'man for year. | .. . | 28 56 | 2 88 | 787 26 | |
| Jones, A. | " 3rd " " | ...... | 15 00 | 2 88 | 732 12 | |
| Adams, J. S. | " 3rd Class Exciseman from July 1. to Oct. 30, 1902 | . .... | 12 50 | 1 92 | 610 58 | |
| Falconer, R. H. | " 2nd Class Ex'man for year, | 35 22 | ...... | 2 88 | 666 90 | |
| Graham, A. L. | " 2nd Class Exciseman from July 1, to Dec. 31, 1902 and 1st Class from Jan. 1, to June 30, 1903 | 35 22 | ... .... | 2 88 | 666 90 | |
| Burns, R. J. | " 3rd Class Exciseman from July 1, to Dec. 31, 1902 and 2nd Class from Jan. 1, to June 30, 1903 | 34 44 | ........ | 2 88 | 652 68 | |
| Mahoney, H. | " " " | 33 13 | ........ | 2 88 | 627 41 | |
| Elliott, T. H. | " Deputy Collector for year | 19 96 | ........ | 2 88 | 377 16 | |
| Henderson, W. | " Deputy Collector; from Aug. 1, 1902 to June 30, 1903. | ..... | 35 00 | 4 20 | 1,335 80 | |
| Weir, Jas | " 1st Class Exciseman from Jan. 1 to June 30, 1903 | ...... | 9 96 | 1 44 | 488 58 | |
| | Salaries | 409 13 | 583 40 | 125 04 | 34,674 86 | |
| | Contingencies | ..... | ....... | ... ... | 2,108 98 | |
| | | | | | | 36,783 84 |

APPENDIX B.—No. 1.—Details of Excise Expenditures, &c., 1902 1903—*Continued.*

| To whom paid. | Service. | Deductions for | | | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | Retirement. | Superannuation. | Guarantee | | |
| | *Windsor.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| McSween, J.... | Salary as Collector for year | | 36 00 | 14 40 | 1.749 60 | |
| Bouteiller, G. A .. | " Special Class Exciseman for year | | 31 96 | 4 32 | 1,563 72 | |
| Crowe, W...... | " Accountant for year.. | ..... | 28 04 | 4 32 | 1.367 64 | |
| Marion, H. R...... | " Deputy Collector for year. | 64 96 | ..... | 7 20 | 1,227 84 | |
| Dunlop, C.. ... | " " " | ..... | 25 96 | 3 60 | 1.270 44 | |
| Gow, J. E.......... | " Special Class Exciseman for year. | ..... | 24 00 | 4 32 | 1.171 68 | |
| Brennan, J...... | " " " | ..... | 24 00 | 4 32 | 1,171 68 | |
| Allen, G. A...... | " 1st Class from July 1, to Oct. 8, 1902, and Special Class Exciseman from Oct. 9, 1902, to June 30, 1903 .. | ... | 22 89 | 3 84 | 1,118 95 | |
| Marcon, F. E. | " 1st Class Exciseman for year.... | | 19 96 | 2 88 | 977 16 | |
| Keogh, P. M .. | " Deputy Collector for year. .. | | 19 96 | 3 60 | 976 44 | |
| Thomas, R...... | " 1st Class Exciseman for year | | 19 96 | 2 88 | 977 16 | |
| Bayard, G. A... | " " " | | 19 96 | 2 88 | 977 16 | |
| Belleperche, A. J. E | " Accountant " | 42 52 | ..... | 2 88 | 804 60 | |
| Jubenville, J. P ... | " 2nd Class Exciseman for year.. | | 16 96 | 2 88 | 830 16 | |
| Falconer, J...... | " 3rd " " | ..... | 15 00 | 2 88 | 732 12 | |
| Crotty, J...... | " 3rd Class Exciseman, from July 1 to Dec. 31, 1902. | | 7 50 | 1 44 | 366 06 | |
| Cahill, J. W.... | " 3rd Class Exciseman for year | | 15 00 | 2 88 | 732 12 | |
| Neil, Jas .. | 3rd Class Exciseman, from July 1 to Dec. 19, 1902, and 2nd Class from Dec. 20, 1902 to June 30, 1903. | 36 18 | | 3 24 | 685 56 | |
| Chilver, F. W .... | " " | 34 08 | .... | 2 88 | 645 54 | |
| McArthur, G. H... | " " | 32 56 | | 2 88 | 616 48 | |
| Beneteau, S ....... | " Probationary Exciseman from Dec. 20, 1902 to June 30, 1903.. | 12 48 | ..... | 1 44 | 236 04 | |
| | Salaries........ | 222 78 | 327 15 | 81 96 | 20,198 15 | |
| | Contingencies | | ...... | ..... | 891 24 | |
| | | | | | | 21,089 39 |
| | *Joliette.* | | | | | |
| Labelle, L. V | Salary as Collector for year.. | 70 04 | | 3 60 | 1.326 36 | |
| Taylor G. W. | " Special Class Exciseman for year.......... | ... | 28 04 | 4 32 | 1.367 64 | |
| Moreau, A.. | Deputy Collector for year | 37 44 | ..... | 3 60 | 708 96 | |
| Ralston, T...... | " " " | 30 00 | ..... | 3 60 | 566 40 | |
| Basinet, L.. | " " from July 1 to July 22, 1902..... | 1 41 | ..... | 0 10 | 26 71 | |
| Forest, M...... | " Deputy Collector for year | 10 04 | ...... | 3 60 | 186 36 | |
| Gamache, J. N... | " " from July 17, 1902 to June 30, 1903. ........ | 28 30 | ..... | 1 65 | 536 17 | |
| | Salaries...... | 177 23 | 28 04 | 20 47 | 4.718 60 | |
| | Contingencies.. | | ... | ...... | 1.063 52 | |
| | | | | | | 5.782 12 |

APPENDIX B.—No. 1.—Details of Excise Expenditures, &c., 1902–1903—*Continued.*

| To whom paid. | Service. | Deductions for Retirement. | Deductions for Superannuation. | Deductions for Guarantee. | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | *Montreal.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Lawlor, H. | Salary as Collector from July 1, 1902 to March 31, 1903. | ... | 32 94 | 10 80 | 1,606 23 | |
| Toupin, F. X. J. A. | " Deputy Collector from July 1, 1902 to March 31, 1903, and Collector from April 1 to June 30, 1903. | | 31 50 | 9 00 | 1,534 50 | |
| Caven, W. | " Deputy Collector for year. | ... | 30 00 | 7 20 | 1,462 80 | |
| Forest, E. R. | " Accountant for year. | ..... | 27 00 | 7 20 | 1,315 80 | |
| Fox, J. D. | " " | ...... | 26 24 | 4 32 | 1,279 44 | |
| Lane, T. M | " " | ..... | 24 00 | 2 88 | 1,173 12 | |
| Fox, T. | " 1st Class Exciseman from July 1 to July 31, 1902. | ..... | 1 66 | 0 24 | 81 43 | |
| Scullion, W. J. | " 1st Class Exciseman for year. | ...... | 19 96 | 2 88 | 977 16 | |
| Macintyre, D. | " 1st Class Exciseman, from July 1, 1902 to March 31, 1903. | ...... | 14 94 | 2 16 | 732 87 | |
| Normandin, G. | " Deputy Collector for year | 49 96 | ....... | 3 60 | 946 44 | |
| Malo, T | " 2nd Class Exciseman " | ...... | 16 96 | 2 88 | 830 16 | |
| Dumouchel, L | " " " | ...... | 16 96 | 2 88 | 830 16 | |
| Courtney, J. J | " " " | ...... | 16 96 | 2 88 | 830 16 | |
| Verner, F. | " " " | ..... | 16 96 | 2 88 | 830 16 | |
| Dixon, H. G. S. | " " " | ...... | 16 96 | 2 88 | 830 16 | |
| Andrews, A. A. | " " " | ...... | 29 68 | 2 88 | 817 44 | |
| Codd, H. J. S. | " " " | ..... | 16 44 | 2 88 | 805 68 | |
| Renaud, A. H. | " 2nd Class Exciseman from July 1, to Dec. 31, 1902, and 1st Class from Jan. 1 to June 30, 1903. | ...... | 28 56 | 2 88 | 787 26 | |
| Deslauriers, J. E. | " 2nd Class Exciseman for year | 39 42 | ........ | 2 88 | 745 20 | |
| Laurier, J. L. | " " " | 39 42 | ..... | 2 88 | 745 20 | |
| Snowden, J. W. | " 2nd Class Exciseman from July 1 to Dec. 31, 1902, and 1st Class from Jan. 1 to June 30, 1903. | 40 92 | ........ | 2 88 | 774 90 | |
| Millier, E | " 3rd Class Exciseman for year | .... | 15 00 | 2 88 | 732 12 | |
| Panneton, G. E. | " " " | .... | 15 00 | 2 88 | 732 12 | |
| Costigan, J. J | " " " | ...... | 15 00 | 2 88 | 732 12 | |
| O'Flaherty, E. J. | " " " | ..... | 15 00 | 2 88 | 732 12 | |
| Brabant, J. B. G. N. | " " " | ...... | 15 00 | 2 88 | 732 12 | |
| Bélair, A. P. | " " " | ...... | 15 00 | 2 88 | 732 12 | |
| Ryan, W. | " " " | 37 44 | ...... | 2 88 | 709 68 | |
| Mainville, C. P. | " " " | ...... | 15 00 | 2 88 | 732 12 | |
| Daveluy, J. P. | " " " | 37 44 | ....... | 2 88 | 709 68 | |
| Comte, L. A. A. J. | " " " | .... | 24 90 | 2 88 | 684 72 | |
| Kearney, D. J. | " 3rd Class Exciseman from July 1 to Dec. 31, 1902, and 1st Class from Jan. 1 to June 30, 1903. | 35 22 | ........ | 2 88 | 666 90 | |
| Bousquet, J. O. | " " " | 35 22 | ........ | 2 88 | 666 90 | |
| Lambert, J. A. | " 3rd Class Exciseman from July 1 to Dec. 31, 1902. and 1st Class from Jan. 1 to June 30, 1903. | 34 62 | ....... | 2 88 | 656 22 | |
| Maranda, N. A. | " 3rd Class Exciseman for year | 31 44 | ........ | 2 88 | 595 68 | |
| David T. | " " " | 31 44 | ........ | 2 88 | 595 68 | |
| Harwood, J. O. A. | " " " | 31 14 | ........ | 2 88 | 588 48 | |
| Fortier, V. | " Deputy Collector for year | 30 00 | .... | 3 60 | 566 40 | |
| Bruyère, H. P. | " " " | 30 00 | ...... | 3 60 | 566 40 | |

APPENDIX B.—No. 1.—Details of Excise Expenditures, &c., 1902-1903—*Continued.*

| To whom paid. | Services. | Deductions for | | | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|---|---|
| | | Retirement. | Superannuation. | Guarantee | | |
| | *Montreal*—Con. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Patterson, C. E. A. | Salary as Deputy Collector for year | 30 00 | | 3 60 | 566 40 | |
| Marin, L. H. | " Probationary Exciseman from July 1 to Aug. 12 1902 and 3rd Class from Aug. 13, 1902 to June 1903 | 29 41 | | 2 88 | 556 13 | |
| Ganvin, E. | " Probationary Exciseman from July 1 to Aug. 12, 3rd Class from Aug 13 to Dec. 31, 1902 and 2nd Class from Jan. 1 to June 30, 1903 | 33 13 | | 2 88 | 627 41 | |
| Bernier, J. A. | " Probationary from July 1 to Aug. 31, 3rd Class from Sept. 1, to Dec 31, 1902 and 2nd Class from Jan. 1 to June 30, 1903. | 32 88 | | 2 88 | 622 56 | |
| St. Michel, F. X. | " Deputy Collector for year | 25 04 | | 3 60 | 471 36 | |
| Bernard, N. J. D. | " Probationary Exciseman from July 1 to Aug. 14, 1902 and 3rd Class from Aug. 15, 1902 to June 30, 1903 | 29 39 | | 2 88 | 555 68 | |
| O'Donnell, M. J. | " Messenger for year | 26 48 | | | 503 52 | |
| Walsh, D. J. | " Special Class Exciseman from Aug 1, 1902 to June 30, 1903 | | 22 00 | 3 96 | 1,074 04 | |
| Chagnon, C. P. | " Dep.-Collector from Ap'l. 6 to June 30, 1903 | 11 79 | | 1 70 | 222 61 | |
| Lamoureux, T. A. | " Probationary from June 6 to June 30, 1903 | 1 73 | | 0 20 | 32 78 | |
| Blais, J. C. F. | " Probationary from June 1 to June 30, 1903 | 2 08 | | 0 24 | 39 34 | |
| Hawkins, A. C. | | | | 0 96 | | |
| Laporte, G | | | | | 2 64 | |
| | Salaries | 725 61 | 519 62 | 163 66 | 37,339 68 | |
| | Contingencies | | | | 4,844 37 | |
| | | | | | | 42,184 05 |
| | *Quebec.* | | | | | |
| LaRue, G | Salary as Collector for year | | 41 40 | 7 20 | 2,021 40 | |
| Cahill, J. H. | " Dep.-Collector " | | | 3 60 | 1,491 36 | |
| Patry, J. H | " " " | 64 96 | | 3 60 | 1,231 44 | |
| Coleman, J. J | " 1st Class Ex'man for year. | | 19 96 | 2 88 | 977 16 | |
| LaRue, A | " Dep.-Collector for year | | 31 44 | 3 60 | 864 96 | |
| Bourget, O. | Unclassified | | 16 96 | 2 88 | 830 16 | |
| Lemoine, J. | Salary as 3rd Class Ex'man for year. | | 15 00 | 2 88 | 732 12 | |
| Lépine, L. | " " " | | 12 00 | 2 88 | 732 12 | |
| Bourassa, J | " " " | | 26 16 | 2 88 | 720 96 | |
| Beaulieu, J. B. | " " " | | 24 90 | 2 88 | 684 72 | |
| Timmons, P. | " " " | | 24 90 | 2 88 | 684 72 | |
| Pelletier, N. G. | " Dep.-Collector " | 25 04 | | 3 60 | 471 36 | |
| Michon, A. E. | " " " | 4 96 | | 1 80 | 93 24 | |
| LaRue, A. P. | " " " | 37 44 | | 3 30 | 709 26 | |
| Ringuet, jr., M. | " " from July 14, 1902 to June 30, 1903 | 1 47 | | 0 37 | 22 80 | |
| | Salaries | 133 87 | 215 72 | 47 23 | 12,267 78 | |
| | Contingencies | | | | 4,689 87 | |
| | | | | | | 16,957 65 |

APPENDIX B.—No. 1.—Details of Excise Expenditures, &c., 1902–1903—*Continued.*

| To whom paid. | Service. | Deductions for Retirement. | Deductions for Superannuation. | Deductions for Guarantee. | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | *Sherbrooke.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Simpson, A. F. | Salary as Collector for year | | 31 96 | 7 20 | 1,560 84 | |
| Quinn, J. D. | " Special Class Exciseman for year | | 24 00 | 4 32 | 1,171 68 | |
| Chartier, E | " Dep.-Collector " | 60 00 | | 3 60 | 1,136 40 | |
| Bowen, F. C. | " 3rd Class Exciseman for year | 37 44 | | 2 88 | 709 68 | |
| Grosbois, (de) C. B. | " " " | 32 16 | | 2 88 | 609 96 | |
| Rousseau, E. H | " Dep.-Collector " | 30 00 | | 3 60 | 566 40 | |
| Vasseur, S. N. | " " from Feb. 14 to June 30, 1903 | 0 78 | | 0 48 | 14 50 | |
| | Salaries | 160 38 | 55 96 | 24 96 | 5,769 46 | |
| | Contingencies | | | | 974 04 | |
| | | | | | | 6,743 50 |
| | *St. Hyacinthe.* | | | | | |
| Benoit, L. V. | Salary as Collector for year | 63 00 | | 7 20 | 1,189 80 | |
| Murray, D. | " 1st Class Exciseman for year | | 19 96 | 2 88 | 977 16 | |
| Fortier, J. J. O. | " Dep.-Collector for year | | 19 96 | 2 88 | 977 16 | |
| Daignault, G. | " " from July 21, 1902 to June 30, 1903 | 37 81 | | 3 30 | 715 80 | |
| Poirier, J. N. | " Dep.-Collector for year | | 24 52 | 2 88 | 672 60 | |
| Deland, A. N. | " " " | 34 96 | | 3 60 | 661 44 | |
| Dumaine, J. D. | " 3rd Class Exciseman for year | 31 44 | | 2 88 | 595 68 | |
| Rouleau, Jr., J. C. | " Dep.-Collector for year | 29 90 | | 2 88 | 565 32 | |
| Tétreault, J. | " " from Sept. 3, 1902 to June 30, 1903 | 4 96 | | 3 60 | 91 44 | |
| Portelance, P. A | " Dep.-Collector from Sept. 3, 1902 to June 30, 1903 | 4 07 | | 1 65 | 77 02 | |
| | Salaries | 206 14 | 64 44 | 33 75 | 6,523 42 | |
| | Contingencies | | | | 1,609 11 | |
| | | | | | | 8.132 53 |
| | *Three Rivers.* | | | | | |
| Hébert, C. D. | Salary as Collector for year | | 24 00 | 3 60 | 1,172 40 | |
| Duplessis, C. Z. | " Dep.-Collector " | | 18 00 | 3 60 | 878 40 | |
| | Salaries | | 42 00 | 7 20 | 2,050 80 | |
| | Contingencies | | | | 556 99 | |
| | | | | | | 2,607 79 |
| | *St. John, N.B.* | | | | | |
| Belyea, T. H. | Salary as Cellector for year | | 29 40 | 9 84 | 1,430 76 | |
| Clark, J. A. | " Deputy Collector for year | | 24 00 | 3 60 | 1,172 40 | |
| McCloskey, J. R. | " 1st Class Exciseman " | | 19 96 | 2 88 | 977 16 | |
| Fitzpatrick, J. | " " " | | 19 96 | 2 88 | 977 16 | |
| Geldart, O. A. | " " " | | 19 96 | 2 88 | 977 16 | |
| Harrison, W. F. | " Deputy Collector " | 49 96 | | 3 60 | 946 44 | |
| Ferguson, J. C. | " 2nd Class Exciseman from July 1 to Dec. 31, 1902, and 1st Class from Jan. 1 to June 30, 1903 | | 16 96 | 2 88 | 830 16 | |
| Dibblee, W. | " Deputy Collector for year | | 3 72 | 2 88 | 293 40 | |
| Dwyer, D. T | " " " | 10 04 | | 3 60 | 186 36 | |
| | Salaries | 60 00 | 133 96 | 35 04 | 7,791 00 | |
| | Contingencies | | | | 609 94 | |
| | | | | | | 8.391 94 |

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1902-1903—*Continued.*

| To whom paid. | Service. | Deductions for | | | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | Retirement. | Superannuation. | Guarantee | | |
| | *Halifax.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Grant, H. H. | Salary as Collector for year | | 36 00 | 7 20 | 1,756 80 | |
| King, R. M. | " Deputy Collector for year | | 25 96 | 3 60 | 1,270 44 | |
| James, T. C. | " Accountant " | | 19 96 | 4 32 | 975 72 | |
| Carroll, D | " 1st Class Exciseman " | | 19 96 | 2 88 | 977 16 | |
| Blethen, C. W. | " " " | | 19 96 | 2 88 | 977 16 | |
| Hubley, H. H. | " " " | | 18 68 | 2 88 | 913 44 | |
| Gorman, A. M. | " " " | | 16 96 | 2 88 | 830 16 | |
| Wainwright, F. G. | " 2nd " " | | 16 96 | 2 88 | 830 16 | |
| Tompkins, P. | " 3rd " " | | 15 00 | 2 88 | 732 12 | |
| Hagarty, P. | " 3rd " " | | 15 00 | 2 88 | 732 12 | |
| Munro H. D | " 3rd " " | | 15 00 | 2 88 | 732 12 | |
| | Salaries | | 219 44 | 38 16 | 10,727 40 | |
| | Contingencies | | | | 424 68 | |
| | | | | | | 11,152 08 |
| | *Pictou.* | | | | | |
| Fraser, P. | Salary as Collector for year | | 19 96 | 3 60 | 976 44 | |
| Macdonald, A. J. | " Deputy Collector for year | 34 96 | | 2 88 | 662 16 | |
| Carroll, F. P | " 3rd Class Exciseman " | 30 38 | | 2 88 | 574 51 | |
| | Salaries | 65 34 | 19 96 | 9 36 | 2,213 11 | |
| | Contingencies | | | | 262 78 | |
| | | | | | | 2,475 89 |
| | *Charlottetown.* | | | | | |
| Nash, S. C. | Salary as Collector for year | | 24 00 | 3 60 | 1,172 40 | |
| Moore, T. | " Deputy Collector for year | | 19 96 | 2 88 | 977 16 | |
| | Salaries | | 43 96 | 6 48 | 2,149 56 | |
| | Contingencies | | | | 107 56 | |
| | | | | | | 2,257 12 |
| | *Winnipeg.* | | | | | |
| Gosnell, T. S | Salary as Collector for year | | 43 20 | 7 20 | 2,109 60 | |
| Watson, W. W | " Deputy Collector for year | | | 3 60 | 1,491 36 | |
| Code, A. | " Accountant " | | 28 04 | 4 32 | 1,367 64 | |
| Hawkins, W. L. | " " " | | 24 00 | 4 32 | 1,171 68 | |
| Girdlestone, R. J. M. | " Deputy Collector " | | 19 96 | 2 88 | 977 16 | |
| Verner, T. H | " 1st Class Exciseman " | | 33 45 | 2 88 | 919 92 | |
| LaRivière, A. C. | " " " | | 31 26 | 2 88 | 858 36 | |
| Sparling, J. W | " Deputy Collector " | 42 48 | | 2 88 | 804 60 | |
| Conklin, W. M | " 1st Class Exciseman " | 42 48 | | 2 88 | 804 60 | |
| Long, W. H. | " " " | 42 48 | | 2 88 | 804 60 | |
| Barnes, G | " Deputy Collector " | 30 00 | | 2 88 | 567 12 | |
| Ross, H. E. | " " " | | 11 92 | 2 88 | 385 20 | |
| Jameson, S. B. | " " " | | 9 00 | 2 88 | 288 12 | |
| McNiven, J. D. | " " " | 12 52 | | 2 88 | 234 60 | |
| Gerow, W. M. | " Proby. Exciseman from Apr. 1 to June 30, 1903 | 6 24 | | 0 72 | 118 02 | |
| | Salaries | 176 20 | 200 83 | 48 96 | 12,902 58 | |
| | Contingencies | | | | 2,955 84 | |
| | | | | | | 15,858 42 |
| | *Calgary.* | | | | | |
| Saucier, X. | Salary as Collector for year | | 24 00 | 3 60 | 1,172 40 | |
| Fletcher, R. W. | " Deputy Collector for year | 40 04 | | 2 88 | 757 08 | |
| Osborne, F. A. | " " " | | 21 00 | 2 88 | 576 12 | |
| Walker, J. H. | " " " | 4 72 | | 2 64 | 88 56 | |
| | Salaries | 44 76 | 45 00 | 12 00 | 2,594 16 | |
| | Contingencies | | | | 1,965 40 | |
| | | | | | | 4,559 56 |

Appendix B.—No. 1.—Details of Excise Expenditures, &c., 1902-1903—*Continued.*

| To whom paid. | Service. | Deductions for | | | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | Retirement. | Superannuation. | Guarantee | | |
| | *Vancouver.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Miller, J. E....... | Salary as Collector for year .......... | ...... | 31 36 | 7 20 | 1,531 44 | |
| Parkinson, E. B. .. | " Deputy Collector for year. | 57 72 | ........ | 3 60 | 1,093 68 | |
| McCraney, H. P... | " " " | 45 00 | ........ | 3 60 | 851 40 | |
| Swannell, F. W.... | " " " | 45 00 | ........ | 3 60 | 851 40 | |
| Cargill, W. ..... | " " " | 36 52 | ........ | 3 60 | 689 88 | |
| Wolfenden, W..... | " " " | 34 96 | ...... | 3 60 | 661 44 | |
| Thorburn, Jas...... | " 3rd Class Exciseman " | 31 44 | ..... ... | 2 88 | 595 68 | |
| McCutcheon, H. M. | " Deputy Collector " | 30 00 | ....... | 3 60 | 566 40 | |
| Hodder, W. E..... | " " " | 30 00 | ... .... | 3 60 | 566 40 | |
| Howell, T..... .... | " " " | 25 04 | .... . | 3 60 | 471 36 | |
| Power, J. F ....... | " 2nd Class Exciseman " | 32 17 | ........ | 2 88 | 609 27 | |
| Stevens, D. B...... | " Deputy Collector " | 19 96 | ........ | 3 60 | 376 44 | |
| Parsons, C. H.. .. | " " " | 10 04 | ........ | 3 60 | 186 36 | |
| | Salaries....... .... . .... | 397 85 | 31 36 | 48 96 | 9,051 15 | |
| | Contingencies ............. | ...... | ........ | ....... | 3,771 19 | |
| | | | | | | 12,822 34 |
| | *Victoria.* | | | | | |
| Jones, R.... ...... | Salary as Collector for year......... | .. | 32 84 | 7 20 | 1,599 96 | |
| O'Sullivan, D..... | " Deputy Collector for year. | .. . | 40 32 | 3 60 | 1,111 08 | |
| Henwood, G. ... | " 1st Class Exciseman " | ... | 19 96 | 2 88 | 977 16 | |
| Ridgman, A. H.... | " " " | . .. | 29 68 | 2 88 | 817 44 | |
| McAloney, J. A.... | " Deputy Collector " | 17 43 | ... .... | 3 60 | 328 92 | |
| | Salaries..................... | 17 43 | 122 80 | 20 16 | 4,834 56 | |
| | Contingencies .............. | .. | .. ..... | ........ | 689 27 | |
| | | | | | | 5,523 83 |

## APPENDIX B.—No. 1.—Details of Excise Expenditures, 1902-1903—*Continued.*

| To whom paid. | Service. | Deductions for: Retirement. | Deductions for: Superannuation. | Deductions for: Guarantee. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|---|---|
| | DISTRICT INSPECTORS. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| | *Ontario.* | | | | | |
| Dingman, N. J. | Salary for year | | 42 00 | 9 00 | 2,049 00 | |
| | Contingencies | | | | 755 10 | 2,804 10 |
| Stratton, W. C. | Salary for year | | 50 00 | 9 00 | 2,441 00 | |
| | Contingencies | | | | 306 97 | 2,747 97 |
| Kenning, J. H. | Salary for year | | | 9 00 | 2,291 00 | |
| | Contingencies | | | | 541 45 | 2,832 45 |
| | *Quebec.* | | | | | |
| Lawlor, H. | Salary from April 1 to June 30, 1903 | | 11 49 | 2 25 | 561 24 | |
| | Contingencies | | | | 100 40 | 661 64 |
| Rinfret, Dr. C. I. | Salary for year | 125 00 | | 9 00 | 2,366 00 | |
| | Contingencies | | | | 166 73 | 2,532 73 |
| | *New Brunswick.* | | | | | |
| Burke, T. | Salary for year | | 50 00 | 9 00 | 2,441 00 | |
| | Contingencies | | | | 226 75 | 2,667 75 |
| | *Manitoba.* | | | | | |
| Barrett, J. K. | Salary for year | | 50 00 | 9 00 | 2,441 00 | |
| | Contingencies | | | | 1,478 15 | 3,919 15 |
| | *British Columbia.* | | | | | |
| Gill, W. | Salary for year | | 50 00 | 9 00 | 2,441 00 | |
| | Contingencies | | | | 528 09 | 2,969 09 |
| | *Inspector of Bonded Factories.* | | | | | |
| Stratton, W. C. | Contingencies | | | | | 140 38 |
| | *Inspector of Distilleries.* | | | | | |
| Kenning, J. H. | Contingencies | | | | | 236 97 |
| | *Provisional Allowance.* | | | | | |
| Power, J. F. | Vancouver, from July 1 to Dec. 31, 1902 | | | | 50 00 | |
| Thorburn, James | " for year | | | | 99 97 | 149 97 |

APPENDIX B.—No. 1. Details of Excise Expenditures, 1902-1903—*Continued.*

| To whom paid. | Service. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|
| | GENERAL CONTINGENCIES. | $ cts. | $ cts. |
| British American Bank Note Co | To pay for bottling labels supplied | 4,872 70 | |
| American Bank Note Co | To pay for stamps and labels supplied | 26,000 00 | |
| The Pritchard-Andrews Co | Rubber stamps, rollers, pads, daters and repairs, &c | 186 35 | |
| Negretti & Zambra | Thermometers, glass cases, test glasses and repairs | 676 43 | |
| Seagram, Jos. E | 4½ barrels fusel oil | 9 50 | |
| Bailey, George & Co | Keys and repairs to locks, &c | 3 30 | |
| Ray, Alex | 1 water still | 6 50 | |
| Stratton, W. C | Expenses attending promotion examinations at Hamilton | 19 25 | |
| Canadian Rubber Co | 125 feet rubber tubing at 8¼c | 16 50 | |
| Graves Bros | Hardware, glasses, nails, &c | 10 60 | |
| Rinfret, Dr. C. I | Expenses attending promotion examinations, Montreal and Ottawa | 67 25 | |
| Thornton & Truman | Repairing locks and keys | 50 40 | |
| Gerald, W. H | Expenses attending promotion examinations, Ottawa | 8 75 | |
| Butterworth & Co | 12 Tobacco ovens | 87 00 | |
| Edwards, W. C. & Co | Lumber and cartage | 56 75 | |
| Eimer & Amend | 6 balances and 3 extra plumets | 69 55 | |
| Calderon, A. M | Services, tracing world's production and consumption of alcohol | 7 00 | |
| McLaughlin, G | Chart, "World's production of alcohol" | 3 15 | |
| Lyman, Sons & Co | Flasks for testing | 2 27 | |
| Wiser, J. P. & Sons | 1 gall. unrectified spirits for sample | 3 00 | |
| Whitehead, Mrs. J | Cleaning storerooms for year | 156 50 | |
| Registrar Exchequer Court | Writs of assistance for C. T. Dickson and E. H. Simon | 5 80 | |
| | " " J. A. Toupin, D. J. Kearney, L. V. Labelle | 8 70 | |
| Canadian Pacific Ry. Co. | Freight on five cases, &c | 11 97 | |
| Dominion Express Co | Express charges | 70 55 | |
| Alaska Pacific Express Co | " | 28 00 | |
| Canadian Express Co | " | 27 00 | |
| City Police Court, Victoria | Expenses in connection with the hearing of six cases | 12 00 | |
| Jones, R | To pay Yip Wing as interpreter in a law case, B. C | 20 00 | |
| Forest, E | To re-imburse him for amount stolen from his cash till | 85 00 | |
| Fréchette, A | Technical translation | 95 42 | |
| Perkins, C | Gratuity voted by Parliament | 80 00 | |
| Potvin, Napoléon | Petty expenses | 3 02 | |
| | Total General Excise Contingencies | | 32,760 21 |
| | *Law Costs.* | | |
| Gouin, Hon. Lomer | Law costs in *re* Rex *vs.* J. J. Clough | 20 00 | |
| | " " Chrs. Benoit and P. Robidoux | 20 00 | |
| | " " J. B. Barrette | 10 00 | |
| | " " M. Legault | 10 00 | |
| | " " Jos. Rapin | 10 00 | |
| | " " J. Leroux | 10 00 | |
| | | | 80 00 |
| Macdonald, D | " in connection with seizures Nos. 88, 97, 100 and 101, Pictou Division, N. S | | 7 50 |
| Ross, W. B | " *re* Rex *vs.* A. N. Brennan | 146 80 | |
| | " " W. R. Bent | 13 00 | |
| | " " A. N. Brennan | 136 32 | |
| | " " N. Leblanc | 12 06 | |
| | " " A. N. Brennan | 36 00 | |
| | | | 344 18 |
| Chisholm, D. C | " " A. G. McDonald | 10 00 | |
| | " " Hugh McGillivray | 10 00 | |
| | " " Duncan McDonald | 20 00 | |
| | " " John Chisholm | 24 50 | |
| | | | 64 50 |
| Langley & Martin | " " Gim Fook Yuen, Young King, Yick Yuen, Side Sing, Jane Yuen, Yuen Shing, Loywo, Sun Wo Lung, Yet Wo Lung | | 117 00 |

APPENDIX B. No. 1.—Details of Excise Expenditures, 1902-1903—*Continued.*

| To whom paid. | Service. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|
| | *Law Costs*—Concluded. | $ cts. | $ cts. |
| Feetzel, Jas. O | Law Costs in *re* Rex *vs* E. Engel | | 75 00 |
| Taché, P. C | " " J. Rioux | | 104 96 |
| Mallish, H | " " N. Leblanc | | 2 52 |
| Pelton, H. S | " " " | | 81 75 |
| Cameron, J. D | Constable fees in Rex *vs.* Malcolm McDonald | | 16 90 |
| | | | 894 31 |

| To whom paid | Place of Residence. | Service. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|
| | | *Commission to Customs Officers.* | $ cts. | $ cts. |
| Kirk, Jas. T | Sussex, N.B | From July 1, 1901 to June 30, 1902 | 102 92 | |
| Binney, J. W | Moncton, N.B | " " | 246 40 | |
| Street, A. F | Fredericton, N.B | " " | 246 40 | |
| Furguson, D | Chatham, N.B | " " | 196 40 | |
| Park, W. A | New Castle, N.B | " " | 196 40 | |
| Anderson, J. J | Sackville, N.B | " " | 132 87 | |
| Marsh, R. J. F | Fort Francis, Man | " " | 47 58 | |
| Tennant, J. F | Gretna, Man | " " | 146 40 | |
| Pound, J. T | Morden, Man | " " | 146 40 | |
| Gilhuly, R. H | Selkirk, Man | " " | 133 44 | |
| Champness, S. S | Lethbridge, N.W.T | " " | 124 46 | |
| Dawson, D | Petrolia, Ont | " " | 196 40 | |
| Gilpin, R. R | Grand Forks, B.C | " " | 196 40 | |
| Brodeur, S. A | Valleyfield, Que | " " | 246 40 | |
| Keay, W. S | Fernie, B.C | " | 246 40 | |
| Lownsborough, W | Lindsay, Ont | From Sept. 1, 1901 to June 30, 1902 | 47 22 | |
| Boyd, A | Antigonish, N.S | From July 1, 1901 to June 30, 1902 | 94 95 | |
| McDonald, J. F | New Glasgow, N.S | " " | 196 40 | |
| McPherson, J | North Sydney, N.S | " " | 146 40 | |
| Ross, W. T | Picton, Ont | From July 1, 1902 to June 30, 1903 | 98 02 | |
| Vaileau, A. S | Deseronto, Ont | " " | 146 40 | |
| McGuire, T. J | Trenton, Ont | " " | 196 40 | |
| Anderson, T. E | Napanee, Ont | " " | 246 40 | |
| Beauchesne, P. C | Paspebiac, Que | " | 4 92 | |
| Kavanagh, A. J | Gaspe, Que | " " | 81 22 | |
| Cauchon, Alp | Lake Megantic, Que | From May 15, 1903 to June 30, 1903 | 19 20 | |
| Watson, Geo | Collingwood, Ont | From July 1, 1902 to June 30, 1903 | 246 40 | |
| Macpherson, W. J | Kincardine, Ont | " " | 19 96 | |
| Cameron, A. McK | Meaford, Ont | " " | 196 40 | |
| Ratchford, C. E | Amherst, N.S | " " | 146 40 | |
| Blair, H. C | Truro, N.S | " " | 246 40 | |
| Kenny, J | Lethbridge, N.W.T | From Oct. 1, 1902 to June 30, 1903 | 147 30 | |
| McKenzie, W | North Bay, Ont | From March 24, 1901 to June 30, 1902 | 230 03 | |
| McDermot, A. L | Cranbrook, B.C | From May 13, 1902 to Feb. 18, 1903 | 182 30 | |
| Lowther, C | Lethbridge, N.W.T | From July 1, 1902 to Sept 17, 1902 | 42 80 | |
| Lownsborough, W | Lindsay, Ont | Guarantee 10 mos. paid up to June 30, 1902 | 3 00 | |
| McKenzie, W | North Bay, Ont | " 12 " " 1902 | 3 60 | |
| Dawson, D | Petrolia, Ont | " 12 " " 1902 | 3 60 | |
| Binney, J. W | Moncton, N.B | " 12 " " 1902 | 3 60 | |
| Anderson, J. J | Sackville, N.B | " 12 " " 1902 | 3 60 | |
| Park, W. A | New Castle, N.B | " 12 " " 1902 | 3 60 | |
| Street, A. F | Fredericton, N.B | " 12 " " 1902 | 3 60 | |
| McDonald, J. W | New Glasgow, N.S | " 12 " " 1902 | 3 60 | |
| Boyd, A | Antigonish, N.S | " 12 " " 1902 | 3 60 | |

## Appendix B.—No. 1.—Details of Excise Expenditures. 1902–1903—*Continued.*

| To whom paid. | Place of Residence. | Service. | Amounts paid. $ | cts. | Total Amounts paid. $ | cts. |
|---|---|---|---|---|---|---|
| | | *Commission to Customs Officers.* | | | | |
| McPherson, J. | North Sydney, N.S. | Guarantee 12 mos. paid up to June 30, 1902 | 3 | 60 | | |
| Furguson, D. | Chatham, N.B. | " 12 " " 1902 | 3 | 60 | | |
| Kirk, J. T. | Sussex, N.B. | " 12 " " 1902 | 3 | 60 | | |
| Nadeau, M. | Claire, N.B. | " 1 " " 1902 | 0 | 30 | | |
| Champness, F. | Lethbridge, N.W.T. | " 12 " " 1902 | 3 | 60 | | |
| Tennant, J. F. | Gretna, Man. | " 12 " " 1902 | 3 | 60 | | |
| Marsh, R. J. F. | Fort Francis, Man. | " 12 " " 1902 | 3 | 60 | | |
| Gilpin, R. R. | Grand Forks, B.C. | " 12 " " 1902 | 3 | 60 | | |
| Campbell, G. | Moyie City, B.C. | " 12 " " 1902 | 3 | 60 | | |
| Pound, J. T. | Morden, Man. | " 12 " " 1902 | 3 | 60 | | |
| Stevenson, J. K. | Moose Jaw, N.W.T. | " 12 " " 1902 | 3 | 60 | | |
| Gilhuly, R. H. | Selkirk, Man. | " 12 " " 1902 | 3 | 60 | | |
| Douglass, H. | Banff, N.W.T. | " 12 " " 1902 | 3 | 60 | | |
| Keay, W. S. | Fernie, B.C. | " 12 " 1902 | 3 | 60 | | |
| McDermott, A. L. | Cranbrook, B.C. | " 13 " " 1902 | 3 | 90 | | |
| Brodeur, S. A. | Valleyfield, Que. | " 12 " " 1902 | 3 | 60 | | |
| Beauchesne, P. C. | Paspébiac, Que. | " 24 " " 1903 | 7 | 20 | | |
| Ross, W. T. | Picton, Ont. | " 12 " " 1903 | 3 | 60 | | |
| Valleau, A. S. | Deseronto, Ont. | " 12 " " 1903 | 3 | 60 | | |
| McGuire, T, J. | Trenton, Ont. | " 12 " " 1903 | 3 | 60 | | |
| Anderson, T. E. | Napanee, Ont. | " 12 " " 1903 | 3 | 60 | | |
| Watson, G. | Collingwood, Ont. | " 12 " " 1903 | 3 | 60 | | |
| McPherson, M. J. | Kincardine, Ont. | " 12 " " 1903 | 3 | 60 | | |
| Cameron, A. McK. | Meaford, Ont. | " 12 " " 1903 | 3 | 60 | | |
| Kavanagh, A. J. | Gaspé, Que. | " 12 " " 1903 | 3 | 60 | | |
| Cauchon, A. | Lake Mégantic, Que. | " 1½ " " 1903 | 0 | 45 | | |
| Ratchford, C. E. | Amherst, N.S. | " 12 " " 1903 | 3 | 60 | | |
| Blair, H. C. | Truro, N.S. | " 12 " " 1903 | 3 | 60 | | |
| Kenny, J. | Lethbridge, N.W.T. | " 9 " " 1903 | 2 | 70 | | |
| Joncas, P. L. | Mag. Islands, Que. | " 18 " " 1902 | 5 | 40 | | |
| | | Total Commission to Customs Officers | | | 5.478 | 94 |
| | | *Commission on Tobacco Stamps.* | | | | |
| Forest, Z. | L'Epiphanie. | Allowance 5 p. c. on sale of stamps | 19 | 75 | | |
| Forest, J. O. E. | " | " " " | 7 | 50 | | |
| Grignon, A. | St. Eustache. | " " " | 2 | 09 | | |
| Lapierre, T. | St. Alexis. | " " " | 21 | 50 | | |
| | | Total | | | 50 | 84 |

APPENDIX B.—No. 1.—Details of Excise Expenditures, 1902–1903—*Continued.*

| To whom paid. | Service. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|
| | *Duty Pay.* | $ cts. | $ cts. |
| Gerald, Chs. | From July 1, 1902, to June 30, 1903 | 200 00 | |
| Jamieson, R. C. | " " | 150 00 | |
| O'Leary, T. J. | " " | 100 00 | |
| Howard, W. W. S. | " " | 100 00 | |
| Brennan, D. J | " " | 125 00 | |
| Hurst, L. B. | " " | 100 00 | |
| Doyle, B. J. | " " | 100 00 | |
| Jones, A. | " " | 100 00 | |
| Bouteiller, G. A. | " " | 200 00 | |
| Gow, J. E. | " " | 150 00 | |
| Brennan, J. | " " | 100 00 | |
| Thomas, Robt | " " | 100 00 | |
| Bayard, G. A. | " " | 100 00 | |
| Marcon, F. E. | " " | 100 00 | |
| Falconer, J. E. | " " | 100 00 | |
| Cahill, J. W | " " | 100 00 | |
| Chilvers, F. W. | " " | 100 00 | |
| Crotty, John (widow of) | " " | 50 00 | |
| Keogh, P. M. | " " | 100 00 | |
| Allen, G. A. | " " | 150 00 | |
| Dawson, W. | " " | 100 00 | |
| Howie, Alex. | " " | 150 00 | |
| Bish, Phil | " " | 100 00 | |
| Woodward, G. W | " " | 100 00 | |
| Kilroy, E. F. | " " | 100 00 | |
| Gerald, W. H. | " " | 150 00 | |
| Macdonald, A. B. | " " | 150 00 | |
| Keeler, G. S. | " " | 100 00 | |
| Johnston, G. E. | " " | 100 00 | |
| Bernard, N. J. D | " " | 100 00 | |
| Baby, W. A. D. | " " | 100 00 | |
| Weir, Jas. | " " | 75 00 | |
| Irwin, Robt. | " " | 100 00 | |
| Cameron, D. M. | " " | 200 00 | |
| Standish, J. G. | " " | 100 00 | |
| McCoy, W. | " " | 150 00 | |
| McFee, A. C. | " " | 100 00 | |
| Mason, F. | " " | 100 00 | |
| Goodman, A. W. | " " | 100 00 | |
| Taylor, G. W. | " " | 150 00 | |
| Moreau, Aug. | " " | 100 00 | |
| Ralston, Tim. | " " | 100 00 | |
| Olivier, H. | " " | 100 00 | |
| Desaulniers, J. E. A. | " " | 200 00 | |
| Millier, E. | " " | 150 00 | |
| Scullion, W. J | " " | 100 00 | |
| Quinn, J. D. | " " | 150 00 | |
| Coleman, J. J. | " " | 150 00 | |
| Traversy, F. X. | " " | 100 00 | |
| Malo, T. | " " | 100 00 | |
| Murray, D. | " " | 100 00 | |
| Weyms, C | " " | 100 00 | |
| Waller, John. | " " | 100 00 | |
| Walsh, D. J | From Aug. 16, 1902, to June 30, 1903 | 87 50 | |
| Bousquet, J. O. | From Oct. 1, 1902, to June 30, 1903 | 75 00 | |
| Mulrooney, G. | From July 1, 1902, to Dec. 31, 1902 | 175 00 | |
| Traversy, F. X. | From July 1, 1902, to June 30, 1903 | 100 00 | |
| McArthur, G. A. | From January 1, 1903, to June 30, 1903 | 50 00 | |
| Johnson, J. J. | From January 1, 1903, to June 30, 1903 | 50 00 | |
| Graham, W. T | From Nov. 24, 1902, to June 30, 1903 | 60 41 | |
| Dick, Walter. | From July 1, 1902, to June 30, 1903 | 200 00 | |
| | Total duty-pay | | 6,897 91 |
| | Grand total | | 398,611 68 |

### APPENDIX B.—No. 1.—Details of Excise Expenditures, 1902-1903—*Continued*,

| To whom paid. | Service | Amounts paid. | Total Amounts paid. |
|---|---|---|---|
| | | $ cts | $ cts |
| | ADD—Printing | 7,072 22 | |
| | Stationery | 1,552 45 | |
| | Lithographing | 515 00 | |
| | | | 9,139 67 |
| | Authorized disbursements (less superannuation, insurance, retirement and guarantee) | | 407,751 35 |
| | ADD—Balances due to Collectors July 1, 1902 | 1,167 53 | |
| | " by " June 30, 19 3 | 343 98 | |
| | | | 1,511 51 |
| | | | 409,262 86 |
| | LESS—Balances due by Collectors, July 1, 1902 | 443 98 | |
| | " to " June 30, 1903 | 49 08 | |
| | | | 493 06 |
| | Actual disbursements agreeing with Statement No. 4. page 12 | | 408,769 80 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## APPENDIX B—*Continued.*

### No. 2.—Distribution of Seizures for the Year ended June 30, 1903.

| Divisions. | To whom paid. | Service. | Amounts paid. | Totals. |
|---|---|---|---|---|
| | | *Ontario.* | $ cts. | $ cts. |
| Hamilton | Miller, W. F. | For his share of seizure, No. 40 | 5 00 | |
| | | To pay informer penalty in seizure, No. 40. | 5 00 | 10 00 |
| St. Catharines | Hesson, C. A. | For his share of seizure, Genl. No. 4,787 | | 50 00 |
| Toronto | Frankland, H. R. | " " " 380 | 25 00 | |
| | | To pay informer penalty in seizure, No. 380. | 25 00 | |
| | | " " " 390. | 25 00 | |
| | | " " " 391. | 25 00 | 100 00 |
| | Brentnall, F. F. | For his share of seizure, Genl. No. 4,762½ | | 25 00 |
| | Mahoney, M. | " " " 4,735 | | 200 00 |
| | Mackenzie, J. H. | " " " 4,780 | 50 00 | |
| | | " " " 4,781 | 60 00 | 110 00 |
| | | *Quebec.* | | |
| Montreal | Lawlor, H. | For his share of seizure, No. 1,065 | 1 00 | |
| | | " " " 1,069 | 0 70 | |
| | | To pay informer penalty in seizure, No. 1,077. | 100 00 | |
| | | " " " 1,078. | 50 00 | 151 70 |
| | Kearney, D. J | For his share of seizure, No. 1,065 | 1 00 | |
| | | " " " 1,070 | 121 53 | 122 53 |
| | O'Grady, D. J | " " " 1,066 | | 2 74 |
| | Carpenter, S. H. | " " " 1,066 | | 2 74 |
| | Laurier, J. L. | " " " 1,070 | 121 52 | |
| | | " " " 1,071 | 1 75 | |
| | | " " " 1,072 | 0 70 | 123 97 |
| | Comte, J. | " " " 1,077 | | 70 40 |
| | Brabant, G. N | " " " 1,077 | | 70 40 |
| | Caven, W | " " " 1,069 | 0 70 | |
| | | " " " 1,071 | 1 75 | |
| | | " " " 1,072 | 0 70 | 3 15 |
| | Warren, G. S. | " " " 1,078 | | 48 45 |
| | Toupin, J. A. | To pay informer penalty in seizure, No. 1,081. | 5 00 | |
| | | " " " " 1,082. | 100 00 | |
| | | " " " " 1,083. | 50 00 | 155 00 |
| Sherbrooke | Simpson, A. F. | For his share of seizure, No. 188 | 23 31 | |
| | | To pay informer penalty in seizure, No. 188. | 12 50 | 35 81 |
| | | *New Brunswick.* | | |
| St. John N.B. | Belyea, T. H. | To pay informer penalty in seizure, No. 105. | 50 00 | |
| | | " " " " 106. | 100 00 | |
| | | " " " " 107. | 100 00 | |
| | | " " " " 108. | 100 00 | 350 00 |
| | | *Nova Scotia.* | | |
| Halifax | Grant, H. H. | To pay informer penalty in seizure, No. 185. | 100 00 | |
| | | " " Genl. " 4,784. | 25 00 | 125 00 |
| | Heffler, Capt. E. | For his share of seizure, Genl. No. 4,784 | | 25 00 |
| Pictou | Campbell, S. J. | " " " 47 | | 0 13 |
| | Curless, C. | " " " 47 | | 0 14 |
| | Fraser, P. | " " " 78 | 1 13 | |
| | | To pay informer penalty in seizure, No. 104. | 50 00 | 51 13 |

## APPENDIX B—*Continued.*

### No. 2.—Distribution of Seizures for the Year ended June 30, 1903—*Concluded.*

| Divisions. | To whom paid. | Service. | Amounts paid. | Totals. |
|---|---|---|---|---|
| | | *Nova Scotia*—Concluded. | $ cts. | $ cts. |
| | McDonald, A. R.... | For his share of seizure, No. 90.......... | ........ | 27 15 |
| | Murray, D.......... | " " " 78.......... | 1 12 | |
| | | " " " 85.......... | 0 90 | |
| | | " " " 90.......... | 27 15 | |
| | | " " " 100.......... | 37 30 | |
| | | " " " 101.......... | 31 81 | 98 28 |
| | | *British Columbia.* | | |
| Vancouver...... | Miller, J. E......... | For his share of seizure, No. 26.......... | 55 00 | |
| | | " " " 27.......... | 25 00 | |
| | | " " " 28.......... | 18 59 | |
| | | To pay informer penalty in seizure, No 30.. | 50 00 | 148 59 |
| Victoria........ | Ridgman, A. H..... | For his share of seizure, No. 28.......... | 15 17 | |
| | | " " " 29.......... | 21 50 | |
| | | " " " 30.......... | 22 75 | |
| | | " " " 31.......... | 21 50 | |
| | | " " " 32.......... | 21 50 | |
| | | " " " 33.......... | 24 00 | 126 42 |
| | Jones, R........... | " " " 28.......... | 15 16 | |
| | | " " " 29.......... | 21 50 | |
| | | " " " 30.......... | 22 75 | |
| | | " " " 31.......... | 21 50 | |
| | | " " " 32.......... | 21 50 | |
| | | " " " 33.......... | 24 00 | 126 41 |
| | Henwood, G....... | " " " 28.......... | ........ | 15 17 |
| | | Total for distribution of seizures.. | ........ | 2,375 31 |

## RECAPITULATION.

| | $ cts. |
|---|---|
| Ontario.......... | $ 495 00 |
| Quebec.......... | 786 89 |
| New Brunswick.......... | 350 00 |
| Nova Scotia.......... | 326 83 |
| British Columbia.......... | 416 59 |
| Total.......... | $ 2,375 31 |

W. J. GERALD,
*Deputy Minister..*

Inland Revenue Department,
Ottawa, August 18, 1903.

## APPENDIX B—*Continued.*

### No. 3.—Details of Sundry Minor Expenditures for the Fiscal Year ended June 30, 1903.

| To whom paid. | Service. | Deduction for Superannuation | Amounts. | Totals. |
|---|---|---|---|---|
| | *Minor Expenditures.* | | $ cts. | $ cts. |
| American Bank Note Co. | To pay for printing Yukon law stamps | | 766 00 | |
| " " | " Dawson Court Stamps | | 628 38 | |
| The Alaska Express Co. | Express charges | | 4 50 | |
| Dominion Express Co. | " | | 3 50 | |
| Yukon Hardware Co | Repairs and 1 lock and keys | | 4 50 | |
| Langley & Martin. | Law costs *re* collecting hydraulic rents from Estate of Joseph Spratt | | 7 60 | |
| | Advertising tenders:— | | | |
| The Hawkesbury Post | Ferry between Hawkesbury and Grenville, Ont | | 10 60 | |
| Pembroke Observer | " Gower Point and Lapasse | | 6 76 | |
| The Eganville Leader | " " " | | 5 30 | |
| Pontiac Advance | " " " | | 7 95 | |
| Pembroke Observer | " " " | | 7 95 | |
| The Ott. Valley Advocate | " " " | | 7 95 | |
| The Eganville Leader | " Fitzroy and Onslow | | 4 90 | |
| Pontiac Advance | " " | | 7 35 | |
| Le Progrès de l'Est | " Campbellton and Cross Point, N.B. | | 7 95 | |
| The Pritchard & Andrews Co. | To pay for 1 cancelling machine | | 15 00 | |
| | | | | 1,496 19 |
| | Add Printing | | | 11 62 |
| | Total, agreeing with statement No. 12, page 21 | | | 1,507 81 |
| | Adulteration of Food. | $ cts. | | |
| Macfarlane, Thomas | Salary as Chief Analyst for the year | 60 00 | 2,940 00 | |
| McGill, A. | " 1st Assistant Analyst for the year | 40 00 | 1,960 00 | |
| Watson, James | " Clerk in laboratory from July 1 to 31, 1902 | | 83 33 | |
| Wright, S. E. | " " for the year | | 600 00 | |
| Levêque, Hector | " Messenger in laboratory for the year | | 530 00 | |
| Watson, J | " Food Inspector from July 1 to 31, 1902 | | 16 66 | |
| Kidd, Thomas | " " for the year | | 500 00 | |
| Costigan, J. J | " " " | 7 00 | 343 00 | |
| Ferguson, J. C. | " " " | 4 00 | 196 00 | |
| Waugh, R. J | " " " | | 300 00 | |
| Conklin, W. M. | " " from Sept. 3, 1902, to June 30, 1902 | | 165 48 | |
| Fletcher, R. W. | " " for the year | | 200 00 | |
| Parkinson, E. B. | " " " | | 200 00 | |
| Rouleau, J. C. | " " " | | 200 00 | |
| Moore, T. | " " " | | 100 00 | |
| | | $111 00 | ....... | 8.334 47 |

## APPENDIX B—*Continued.*

### No. 3.—DETAILS of Sundry Minor Expenditures, 1902-1903—*Continued.*

| To whom paid. | Service. | Amounts. | Totals. |
|---|---|---|---|
| | ADULTERATION OF FOOD—*Continued.* | $ cts. | $ cts. |
| | *Contingencies.* | | |
| Macfarlane, T | Travelling and Contingent expenses in connection with laboratory | 2,688 60 | |
| " | Rent of laboratory | 400 00 | |
| Kidd, Thomas | Travelling expenses and purchases of samples | 276 33 | |
| Costigan, J. J | " " " | 257 78 | |
| Ferguson, J. C. | " " " | 83 71 | |
| Waugh, R. J. | " " " | 85 46 | |
| Conklin, W. M. | " " " | 117 58 | |
| Parkinson, E. B | " " " | 68 75 | |
| Fletcher, R. W. | " " " | 103 75 | |
| Moore, T | " " " | 30 06 | |
| Rouleau, J. C. | " " " | 121 77 | |
| Simpson, A. F | " " " | 9 50 | |
| | | | 4,243 29 |
| Fiset, M. | Allowance under Act for retaining fees | 250 00 | |
| | " " materials used in analysis | 125 00 | |
| | | | 375 00 |
| Ellis, W. H. | " " retaining fees | 250 00 | |
| | " " rent | 125 00 | |
| | " " materials used in analysis | 125 00 | |
| | | | 500 00 |
| Donald, J. T. | " " retaining fees | 250 00 | |
| | " " rent | 125 00 | |
| | " " materials used in analysis | 125 00 | |
| | Fees for analysis | 160 00 | |
| | | | 660 00 |
| Bowman, M | Allowance under Act for retaining fees | 250 00 | |
| | " " rent | 125 00 | |
| | " " materials used in analysis | 125 00 | |
| | Fees for analysis | 120 55 | |
| | | | 620 55 |
| Kenrick, E. B | Allowance under Act for retaining fees | 250 00 | |
| | " " rent | 125 00 | |
| | " " materials used in analysis | 125 00 | |
| | Fees for analysis | 211 50 | |
| | | | 711 50 |
| Fagan, J. C | Allowance under Act for retaining fees | 250 00 | |
| | " " rent | 125 00 | |
| | " " materials used in analysis | 125.00 | |
| | Fees for analysis | 160 00 | |
| | | | 660 00 |
| Valade, F. X | Allowance under Act for retaining fees | 250 00 | |
| | " " rent | 125 00 | |
| | " " materials used in analysis | 125 00 | |
| | | | 500 00 |
| Benoit, L. V., for Tourchot, A. L | Allowance under Act for retaining fees | 200 00 | |
| | " " materials used in analysis | 100 00 | |
| | Fees for analysis | 96 00 | |
| | | | 396 00 |
| Harrison, F. T. | Allowance under Act for retaining fees | 250 00 | |
| | " " materials used in analysis | 125 00 | |
| | | | 375 00 |
| The Pritchard-Andrews Co | Repairs and brass seals, &c. | 23 10 | |
| Baird & Tatlock | Chemicals and chemical apparatus | 154 94 | |
| Chandler & Massey | Objectives for laboratory | 13 25 | |
| Eimer & Amend | Apparatus for laboratory | 64 88 | |
| Dubuc, A. J | Chemicals for laboratory | 4 20 | |
| Gooderham & Worts | Alcohol for laboratory, 47·53 gallons at $1.26; Express charges $4.20 | 64 09 | |
| Benoit, L. V | Rent of telephone (St. Hyacinthe) | 10 00 | |
| Lyman Sons & Co. | Chemical apparatus, &c. | 100 54 | |

## APPENDIX B—*Continued.*

### No. 3.—DETAILS of Sundry Minor Expenditures, 1902-1903—*Concluded.*

| To whom paid. | Service. | Amounts. | Totals. |
|---|---|---|---|
| | ADULTERATION OF FOOD—*Concluded.* | $ cts. | $ cts. |
| | *Contingencies*—Concluded. | | |
| Choquette, Revd. C. P.. | Attending Board of Examiners in connection with A. Lemoine's examination | 27 00 | |
| Girdwood, S. P. | Attending Board of Examiners at Montreal | 20 00 | |
| Chemists & Surgeons Supply Co. | Electric stove, Immersion coil, &c. | 32 91 | |
| Ferguson, J. M | Services in connection with an Act respecting adulteration of food. | 100 00 | |
| Lemoine, Alp. | Services in laboratory during the year. | 600 00 | |
| Valin, J. A. | " " | 400 00 | |
| | Total adulteration of food expenditures | | 18,980 72 |
| | Add Printing | 662 67 | |
| | Stationery | 86 74 | |
| | | | 749 41 |
| | Grand total, agreeing with statement No. 8 page 18 | | 10,730 13 |

## APPENDIX B—*Continued.*

### No. 4—DETAILS of Departmental Expenditures for the Year ended June 30, 1903.

| Names. | Rank. | Period. | Deductions for Superannuation. | Deductions for Retirement. | Deductions for Insurance. | Amounts paid. | Totals. |
|---|---|---|---|---|---|---|---|
| | | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Bernier, Hon. M. E. | Minister | For the year | | | | 7,000 00 | |
| Gerald, W. J. | Deputy Minister | " | | | | 3,200 00 | |
| Himsworth, Wm. | Chief Clerk, Secretary | " | 48 00 | | | 2,352 00 | |
| Campeau, F. R. E. | Chief Clerk, Accountant | " | 48 00 | | | 2,352 00 | |
| Valin, J. E. | Assistant Accountant | " | 36 00 | | | 1,764 00 | |
| Carter, Wm. | Assistant Secretary | " | 36 00 | | | 1,764 00 | |
| Shaw, J. F. | Chief Statistical Clerk, Accountant's Branch | " | 34 00 | | | 1,666 00 | |
| Doyon, J. A. | Weights and Measures Clerk, Accountant's Branch | " | 32 00 | | | 1,568 00 | |
| Westman, T. | Statistical Clerk, Accountant's Branch | " | 31 00 | | | 1,519 00 | |
| Quain, R. | Accountant's Branch Clerk | " | 43 50 | | 61 92 | 1,344 58 | |
| Fowler, G. | Clerk of Supplies, Secretary's Branch | " | 29 00 | | | 1,421 00 | |
| Newby, F. | Secretary's Branch Clerk | " | 28 00 | | | 1,372 00 | |
| Dunne, J. P. | Accountant's Branch Clerk | " | 28 00 | | | 1,372 00 | |
| Burns, J. | Weights and Measures Clerk, Accountant's Branch | " | 28 00 | | | 1,372 00 | |
| Hudon, L. E. | Statistical Clerk, Accountant's Branch | " | 42 00 | | | 1,158 00 | |
| Hughes, P. A. | Accountant's Branch Clerk | " | 40 25 | | | 1,109 75 | |
| McCullough, A. | Secretary's Branch Clerk | " | 23 00 | | | 1,127 00 | |
| Halliday, Wm. A. | Accountant's Branch Clerk | " | 40 25 | | | 1,109 75 | |
| Bouchette, R. E. | Weights and Measures Clerk, Accountant's Branch | " | 40 25 | | | 1,109 75 | |
| Roy, L. G. | Accountant's Branch Clerk | " | 31 50 | | | 868 50 | |
| Chevrier, B. | Junior Second Class Clerk | " | | 32 50 | | 617 50 | |
| Lawless, E. M. | Secretary's Branch Clerk | " | | 30 00 | | 570 00 | |
| Hagarty, B. | Secretary's Branch Clerk | " | | 30 00 | | 570 00 | |
| Charboneau, E. | Secretary's Branch Clerk | " | | 30 00 | | 570 00 | |
| Bourgault, Alph. | Private Secretary | " | | | | 600 00 | |
| Potvin, N. | Messenger | " | 17 40 | | | 562 60 | |
| Yetts, R. P. | Messenger | " | 14 40 | | 54 48 | 411 12 | |
| | Total Salaries | | 670 55 | 122 50 | 116 40 | | 40,450 55 |

## APPENDIX B—*Continued.*

### No. 4.—Details of Departmental Expenditures, 1902-1903—*Continued.*

| Names. | Service. | Amounts paid. | Totals. |
|---|---|---|---|
| | | $ cts. | $ cts. |
| Doyle, Miss E. T | Extra clerk for the year | 400 00 | |
| Watson, Miss A | ″ ″ | 400 00 | |
| Robert, A | Messenger | 315 00 | |
| Postmaster | Postage | 20 09 | |
| Controller of Stationery | Stationery | 1,685 72 | |
| ″ ″ | Parliamentary Publications | 42 00 | |
| ″ ″ | Books, &c., &c. | 395 90 | |
| King's Printer | Lithographing | 22 50 | |
| ″ | Printing | 853 88 | |
| C. P. Railway Co.'s Telegraph | Telegraph account | 138 12 | |
| G. N. W. Telegraph Co | ″ | 51 93 | |
| The Bell Telephone Co | Telephone messages | 6 10 | |
| Gerald, W. J | Travelling expenses | 27 07 | |
| Carson, Hugh | 1 leather mail bag | 7 00 | |
| Jones, Yarrell & Poulter, London, Eng | Subscription | 23 61 | |
| L'Evangeline, Weymouth, N.S. | ″ | 2 50 | |
| Canadian Gazette, London, Eng | ″ | 4 38 | |
| Shareholder, Montreal | ″ | 2 00 | |
| Intelligencer, Belleville | ″ | 3 00 | |
| Daily Telegraph, St. John | ″ | 10 00 | |
| The Catholic Record, London, O. | ″ | 2 00 | |
| Bulletin des Recherches Historiques, Lévis, Que | ″ | 2 00 | |
| Daily Chronicle, Halifax | ″ | 5 00 | |
| Scientific American, New York | ″ | 7 00 | |
| Saskatchewan Phœnix, N.W.T. | ″ | 1 65 | |
| Le Temps, Ottawa | ″ | 3 00 | |
| Mail & Empire, Toronto | ″ | 4 00 | |
| The Daily Witness, Montreal | ″ | 6 00 | |
| The Toronto World, Toronto | ″ | 3 00 | |
| Le Soleil, Quebec | ″ | 6 00 | |
| Saturday Night, Toronto | ″ | 4 00 | |
| Canadian Mining Review, Ottawa | ″ | 3 00 | |
| The Citizen, Ottawa | ″ | 6 00 | |
| Daily Telegraph, Quebec | ″ | 6 00 | |
| Saturday Budget, Quebec | ″ | 1 00 | |
| La Patrie, Montreal | ″ | 3 00 | |
| Canadian Manufacturer, Toronto | ″ | 1 00 | |
| Evening Journal, Ottawa | ″ | 6 60 | |
| The Chronicle Publishing Co., Halifax, N.S. | ″ | 5 00 | |
| Free Press, Ottawa, Ont. | ″ | 7 20 | |
| La Presse, Montreal | ″ | 6 00 | |
| Times Printing Co., Hamilton | ″ | 3 00 | |
| Blackadar Bros., Halifax | ″ | 5 00 | |
| Daily Star, Toronto | ″ | 1 50 | |
| The Star, Montreal | ″ | 3 00 | |
| Saturday Night, Toronto | ″ | 4 00 | |
| Chatham Daily News, Chatham | ″ | 4 00 | |
| The Gazette, Montreal | ″ | 12 00 | |
| Globe Printing Co., Toronto | ″ | 8 00 | |
| The News Printing Co., Toronto | ″ | 2 20 | |
| La Tribune, St. Hyacinthe | ″ | 3 00 | |
| The Farmers Advocate, London | ″ | 1 00 | |
| L'Evangeline, Weymouth | ″ | 3 00 | |
| Catholic Register, Toronto | ″ | 1 00 | |
| Manitoba Free Press, Winnipeg | ″ | 8 00 | |
| The Examiner, Sherbrooke | ″ | 1 00 | |
| Canadian Mining Review, Ottawa | ″ | 3 00 | |
| Le Cultivateur, Montreal | ″ | 2 00 | |
| Bryson, Graham & Co., Ottawa | Towels, &c | 12 40 | |
| C. Latrémouille, Ottawa | Matches, combs, brushes, &c | 9 74 | |
| Canadian Express Co., Ottawa | Freight | 2 90 | |
| Dominion Express Co., Ottawa | ″ | 1 25 | |
| A. M. Storr, Ottawa | Cartage | 86 75 | |

## APPENDIX B—*Continued.*

### No. 4.—Details of Departmental Expenditures, 1902-1093.—*Concluded.*

| Names. | Service. | Amounts paid. | Totals. |
|---|---|---|---|
| | *Contingencies.* | $ cts. | $ cts. |
| Mrs. S. Maveity | Washing towels | 60 00 | |
| Payment. T | Soap, &c | 8 00 | |
| Ottawa Electric Co | Tickets | 10 00 | |
| Sproule, W. H., Ottawa | Repairing clocks | 10 00 | |
| Dupont, J. C., Ottawa | Matches, &c | 4 50 | |
| Pittaway, A. G., Ottawa | Goods | 4 00 | |
| Potvin, Nap., Ottawa | Sundry petty expenses | 15 75 | |
| | Total, Departmental Contingencies | | 4,789 24 |
| | Authorized disbursements (less superannuation, retirement and insurance) | | 45,239 79 |
| | Add—Balance due June 30, 1903 | | 16 66 |
| | | | 45,256 45 |
| | Less—Balance due July 1, 1902 | | 16 66 |
| | Actual disbursements, agreeing with Statement No. 17, pags 48 | | 45,239 79 |

W. J. GERALD,
*Deputy Minister,*

Inland Revenue Department,
Ottawa, August 18, 1903.

## APPENDIX B—*Continued.*

### No. 7.—DETAILS of Weights and Measures Expenditures for the Year ended June 30, 1903.

| To whom paid. | Service. | Deductions for | | | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | Insurance. | Superannuation. | Guarantee. | | |
| | *Belleville.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Johnson, W | Salary as Inspector for year | | 24 00 | 3 60 | 1,172 40 | |
| Slattery, T | " Mechanical Inspector for year | | 13 96 | 1 80 | 684 24 | |
| Irwin, S | " Asst. Inspector for year | | 13 96 | 1 80 | 684 24 | |
| Behan, J. J. | " " " | | | 1 80 | 598 20 | |
| Errett, R. W. | " " " | | | 1 80 | 198 12 | |
| | Salaries | | 51 92 | 10 80 | 3.387 24 | |
| | Contingencies | | | | 2,521 76 | |
| | | | | | | 5,909 00 |
| | *Hamilton.* | | | | | |
| Freed, A. T | Salary as Inspector for year | | | 3 60 | 1,596 36 | |
| McDonald, J. | " Asst. Inspector for year | | 16 04 | 1 80 | 782 16 | |
| Marentette, A. | " " " | | 16 04 | 1 80 | 782 16 | |
| Fitzgerald, E. W. | " " " | | | 1 80 | 748 20 | |
| Wheatley, A. E. | " " " | | | 1 80 | 748 20 | |
| Laidman, R. H. | " " " | | | 1 80 | 698 16 | |
| Jarvis, H | " " " | | | 1 80 | 598 20 | |
| Robins, S. W. | " " " | | | 1 80 | 498 12 | |
| | Salaries | | 32 08 | 16 20 | 6,451 56 | |
| | Contingencies | | | | 1,344 44 | |
| | | | | | | 7,796 00 |
| | *Ottawa.* | | | | | |
| Macdonald, J. A. | Salary as Inspector for year | | | 3 60 | 1,396 32 | |
| Breen, J | " Asst. Inspector for year | | | 1 80 | 648 12 | |
| McFarlane, J. | " " " | | 13 04 | 1 80 | 635 16 | |
| Winsor, J | " " " | | | 1 80 | 698 16 | |
| Elliott, T. H. | " " " | 41 76 | | 1 80 | 556 44 | |
| Findlay, R | " " from Mar. 2 to June 30, 1903 | | | 0 60 | 164 70 | |
| | Salaries | 41 76 | 13 04 | 11 40 | 4.098 90 | |
| | Contingencies | | | | 1,789 14 | |
| | | | | | | 5,888 04 |
| | *Toronto.* | | | | | |
| Kelly, D | Salary as Inspector for year | | | 3 60 | 1,296 36 | |
| Milligan, R. J. | " Asst. Inspector for year | | | 1 80 | 798 12 | |
| Wright, R. J. | " " " | | 16 04 | 1 80 | 782 16 | |
| Smith, J. C | " " " | | | 1 80 | 648 12 | |
| Murdoch, J | " " " | | | 1 80 | 648 12 | |
| | Salaries | | 16 04 | 10 80 | 4,172 88 | |
| | Contingencies | | | | 1,775 35 | |
| | | | | | | 5,948 23 |
| | *Windsor.* | | | | | |
| Hayward, W. J. | Salary as Inspector for year | | 28 04 | 3 60 | 1,368 36 | |
| Coughlin, D. | " Asst. Inspector for year | | | 1 80 | 798 12 | |
| Thomas, J. S. | " " " | | | 1 80 | 798 12 | |
| Hughes, R. A. | " " " | | | 1 80 | 748 20 | |
| | Salaries | | 28 04 | 9 00 | 3,712 80 | |
| | Contingencies | | | | 1,555 33 | |
| | | | | | | 5,268 13 |

## APPENDIX B—*Continued.*

### No. 5—Details of Weights and Measures Expenditures, 1902-1903—*Continued.*

| To whom paid. | Service. | Deductions for Insurance. | Deductions for Superannuation. | Deductions for Guarantee. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|---|---|
| | *Montreal.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Chalus, J. O | Salary as Inspector for year | | 31 96 | 3 60 | 1,564 44 | |
| Daoust, J. A | " Asst. Inspector for year | | 16 04 | 1 80 | 782 16 | |
| Gervais, S | " " " | | 16 04 | 1 80 | 782 16 | |
| Hébert, J. A. P | " " " | | | 1 80 | 798 12 | |
| Boudet, E | " " " | | | 1 80 | 798 12 | |
| Collins, D | " " " | | | 1 80 | 798 12 | |
| Baker, J. S | " " " | | | 1 80 | 698 16 | |
| Dessert, V | " " " | | | 1 80 | 648 12 | |
| | Salaries | | 64 04 | 16 20 | 6,869 40 | |
| | Contingencies | | | | 1,498 34 | 8,367 74 |
| | *Quebec.* | | | | | |
| Guay, G. N. | Salary as Inspector for year | | | 3 60 | 1,196 40 | |
| LeBel, J. A. W | " Asst. Inspector for year | | 38 60 | 1 80 | 1,059 60 | |
| Kelly, M. J. | " " " | 38 28 | 23 96 | 1 80 | 735 96 | |
| Guay, A | " " " | | | 1 80 | 698 16 | |
| Chabot, F. X | " " from July 1 to Oct. 1, 1902 | | 3 00 | 0 45 | 146 55 | |
| Petit, J. B | " Asst. Inspector for year | | | 1 80 | 598 20 | |
| Préfontaine, F. X. | " " " | | | 1 80 | 598 20 | |
| Moreau, A | " " " | | 6 32 | 1 80 | 491 88 | |
| Knowles, Chas | " " " | | 6 00 | | 294 00 | |
| Bourget, L. J | " " from Jan. 1 to June 30, 1903 | | | 0 75 | 241 14 | |
| | Salaries | 38 28 | 77 88 | 15 60 | 6,060 09 | |
| | Contingencies | | | | 2,009 14 | 8,069 23 |
| | *St. Hyacinthe.* | | | | | |
| Morin, J. P. | Salary as Inspector for year | | | 3 60 | 796 32 | |
| Tomlinson, W. W. | " Asst. Inspector for year | | | 1 80 | 698 16 | |
| Fournier, L. A | " " " | | | 1 80 | 598 20 | |
| Beaulac, J. H | " " from June 1 to June 30, 1903 | | | 0 15 | 41 51 | |
| | Salaries | | | 7 35 | 2,134 19 | |
| | Contingencies | | | | 761 91 | 2,896 10 |
| | *Three Rivers.* | | | | | |
| Gravel, A. I | Salary as Inspector for year | | | 3 60 | 996 36 | |
| Beaulac, J. H. | " " from July 1, 1902, to May 31, 1903 | | | 1 65 | 456 61 | |
| Bolduc, E | " Inspector from Aug 1, 1902, to June 30, 1903 | | | 1 65 | 456 61 | |
| | Salaries | | | 6 90 | 1,909 58 | |
| | Contingencies | | | | 594 61 | 2,504 19 |
| | *St. John, N.B.* | | | | | |
| Wilmot, J. B. | Salary as Inspector from July 1, 1902 to April 1, 1903, | | 18 00 | 2 70 | 879 30 | |
| Cowan, E | " Asst. Inspector for year | | 13 96 | 1 80 | 684 24 | |
| Richard, D. | " " " | | 12 00 | 1 80 | 586 20 | |
| Bernier, J. A | " " " | | | 1 30 | 598 20 | |
| Barry, Jas | " Inspector from May 30 to June 30, 1903 | | | 0 30 | 106 14 | |
| | Salaries | | 43 96 | 8 40 | 2,854 08 | |
| | Contingencies | | | | 358 59 | 3,212 67 |

## APPENDIX B.—*Continued.*

### No. 5.—Details of Weights and Measures Expenditures, 1902-1903—*Continued.*

| To whom paid. | Service. | Deductions for: Retirement. | Deductions for: Superannuation. | Deductions for: Guarantee. | Amounts paid. | Total amounts paid. |
|---|---|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| | *Cape Breton.* | | | | | |
| Laurence, G. C. | Salary as Inspector for year | | | 3 60 | 796 40 | |
| | Contingencies | | | | 517 61 | |
| | | | | | | 1,314 01 |
| | *Halifax.* | | | | | |
| Frame, A. | Salary as Inspector for year | | | 3 60 | 996 36 | |
| Waugh, R. J. | ″ Asst. Inspector for year | | | 1 80 | 598 20 | |
| | Salaries | | | 5 40 | 1,594 56 | |
| | Contingencies | | | | 1,700 93 | |
| | | | | | | 3,295 49 |
| | *Pictou.* | | | | | |
| Dustan, W. M. | Salary as Inspector for year | | 19 96 | 3 60 | 976 44 | |
| Chisholm, J. J. | ″ Asst. Inspector for year | | | 1 80 | 598 20 | |
| | Salaries | | 19 96 | 5 40 | 1,574 64 | |
| | Contingencies | | | | 331 09 | |
| | | | | | | 1,905 73 |
| | *Charlottetown.* | | | | | |
| Davy, E | Salary as Inspector for year | | | 3 60 | 946 32 | |
| Hughes, H. | ″ Asst. Inspector for year | | | 1 80 | 598 20 | |
| | Salaries | | | 5 40 | 1,544 52 | |
| | Contingencies | | | | 212 11 | |
| | | | | | | 1,756 63 |
| | *Winnipeg.* | | | | | |
| Magness, R. | Salary as Inspector for year | | | 3 60 | 1,396 32 | |
| McDonald, A. W. | ″ Asst. Inspector for year | | | 1 80 | 698 16 | |
| Mager, J. G | ″ ″ ″ | | | 1 80 | 598 20 | |
| Girdlestone, R.J.M | ″ ″ ″ | | 4 04 | 1 80 | 194 16 | |
| Ross, H. E. | ″ ″ ″ | | | 1 80 | 98 16 | |
| | Salaries | | 4 04 | 10 80 | 2,985 00 | |
| | Contingencies | | | | 2,800 53 | |
| | | | | | | 5,785 53 |
| | *Calgary.* | | | | | |
| Costello, J. W. | Salary as Asst. Inspector for year | | 15 00 | 1 80 | 733 20 | |
| Saucier, X. | ″ Inspector from Sept. 3, 1902 to June 30, 1903 | | | 2 98 | 162 50 | |
| | Salaries | | 15 00 | 4 78 | 895 70 | |
| | Contingencies | | | | 295 85 | |
| | | | | | | 1.191 55 |
| | *Victoria.* | | | | | |
| Findley, H. | Salary as Inspector for year | | | 3 60 | 796 32 | |
| McAloney, J. A. | ″ Asst. Inspector for year | | | 1 80 | 348 12 | |
| Parker, Thos. | ″ ″ ″ | | | 1 80 | 598 20 | |
| | Salaries | | | 7 20 | 1,742 64 | |
| | Contingencies | | | | 1,731 38 | |
| | | | | | | 3,474 02 |
| | *Chief Inspector.* | | | | | |
| Fyfe, Jas. | Salary as Chief Inspector from Oct. 13, 1902, to June 30, 1903 | | | | 1,794 33 | |
| | Contingencies | | | | 241 35 | |
| | | | | | | 2,035 68 |

## APPENDIX B—*Continued.*

### No. 5.—Details of Weights and Measures, Expenditures for the Year ended June 30, 1903—*Concluded.*

| To whom paid. | Service. | Amounts paid. | Totals. |
|---|---|---|---|
| | *Contingencies.* | $ cts. | $ cts. |
| Havez, Veuve Louis | 200 samples of metric sets | 1,744 42 | |
| Richer, E. H. & Fils | 1 sample metric sets, metric tables, &c | 464 45 | |
| Avery, W. & T | Metric weights and measures | 3,184 66 | |
| Ulmann, E | Samples of metric sets | 1,490 20 | |
| Fournier, E | Binding of books on metric system (220) | 26 40 | |
| Vincent, A | 652 books on metric system | 163 00 | |
| Storr, A. M | Cartage | 1 25 | |
| Edwards, W. C. & Co., Ltd. | Lumber and cartage | 41 18 | |
| Graves Bros | Glasses | 10 50 | |
| Francois, Albert | Books on metric system | 1 05 | |
| Can. Pac. Railway Co | Freight | 2 46 | |
| Burgess, Thos | Salary as mechanical assistant for the year | 800 00 | |
| The Pritchard & Andrews Co | Numerals, daters, steel punches, stamps and repairs | 86 50 | |
| Edwards, E. B | Law costs in *re* Rex vs. Stevens | 116 80 | |
| Bailey, G. & Co | Brass springs and repairs | 13 00 | |
| Fyfe, Jas | Expenses to Ottawa in connection with examining scales and making report on same | 17 00 | |
| Plamondon, J. D | Law costs in *re* Rex. vs. Pinsonnault | 117 50 | |
| Bruneau, A. A | " " " | 105 00 | |
| Johnson, W | " " Stevens | 37 09 | |
| Thornton & Truman | 24 latches and 14 brass hooks | 5 80 | |
| Millard, H. R. | 3 ark stones and 3 ark fyles, &c | 7 85 | |
| St. Laurent, G | ½ gross ready cleaners | 18 00 | |
| Nicholson File Co | 100 cast steel | 12 00 | |
| Kelly, M. J | Gratuity voted by parliament | 159 90 | |
| Guay, A | " " | 30 00 | |
| Ladouceur, Jos | Services 27 days at $2 per diem | 54 00 | |
| Canadian Express Co | Express charges | 102 05 | |
| Dominion Express Co | " | 88 37 | |
| Canada Atlantic Ry. Co | Freight | 1 25 | |
| Potvin, Napoléon | Sundry petty expenses | 1 97 | |
| | | 8,903 65 | |
| | Less—Refund | 1 00 | |
| | Total general contingencies | | 8,902 65 |
| | Grand total | | 85,520 62 |
| | Add—Printing | 1,174 28 | |
| | Stationery | 211 43 | |
| | | | 1,385 71 |
| | Actual disbursements (less superannuation, insurance, retirement and guarantee) | | 86,906 33 |
| | Add—Old balances due by Inspectors June 30, 1903 | | 193 26 |
| | | | 87,099 59 |
| | Less—Old balances due by Inspectors July 1, 1902 | | 193 26 |
| | Actual disbursements, agreeing with statement No. 20a, page 54 | | 86,906 33 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## APPENDIX B—*Continued.*

### No. 6.—DETAILS of Gas Inspection Expenditures for the Year ended June 30, 1903.

| To whom paid. | Service. | Deductions for Retirement. | Deductions for Superannuation. | Deductions for Guarantee. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|---|---|
| | *Barrie.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Shanacy, M ...... | Salary as Inspector for year......... | ..... | 2 00 | 3 60 | 94 40 | 94 40 |
| | *Belleville.* | | | | | |
| Johnson, W .... | Salary as Inspector for year........ | .... | 7 04 | 3 60 | 339 36 | |
| Stuart, W. E.... | " Asst. " " ......... | .... | ....... | 2 88 | 97 08 | |
| | Salaries.......... | ...... | 7 04 | 6 48 | 436 44 | |
| | Contingencies.... | ... | ... ... | ... ... | 274 50 | |
| | | | | | | 710 94 |
| | *Berlin.* | | | | | |
| Broadfoot, S .... | Salary as Inspector for year ......... | .... | ....... | 3 60 | 96 40 | |
| | Contingencies. ......... | .... | ...... | ........ | 67 06 | |
| | | | | | | 163 46 |
| | *Brockville.* | | | | | |
| Johnston, C. W... | Contingencies as Acting Inspector for year .................. | ... | ...... | ... ... | ... ...... | 114 91 |
| | *Cobourg.* | | | | | |
| Bickle, J. W ..... | Salary as Inspector for year.......... | ... | 2 00 | 3 60 | 94 40 | |
| | Contingencies. ......... | ... | ... ..... | .... | 64 45 | |
| | | | | | | 158 85 |
| | *Cornwall.* | | | | | |
| Mulhern, M. M... | Salary as Inspector for year...... | .. | 2 00 | 3 60 | 94 40 | |
| | Contingencies.......... | .... | .. ..... | ...... | 46 80 | |
| | | | | | | 141 20 |
| | *Guelph.* | | | | | |
| Broadfoot, S...... | Salary as Inspector for year........... | .... | 4 00 | 3 60 | 192 40 | |
| | Contingencies.......... ... | .... | ... ..... | .. .... | 13 64 | |
| | | | | | | 206 04 |
| | *Hamilton.* | | | | | |
| McPhie, D... ... | Salary as Inspector for year. ... .... | ... | 36 00 | 3 60 | 1,760 40 | |
| McPhie, W. H ... | " Asst. " " .. ..... | ..... | ....... | 1 80 | 598 20 | |
| Dennis, W. A.... | " " " " ......... | ..... | ....... | 1 80 | 98 16 | |
| | Salaries....... ....... .. ... ... | ... | 36 00 | 7 20 | 2,456 76 | |
| | Contingencies....... ........ | .... | .... .. | ....... | 230 74 | |
| | | | | | | 2,687 50 |
| | *Kingston.* | | | | | |
| Behan, J. J. . . . | Salary as Inspector for year... ....... | ..... | ...... | 3 60 | 396 40 | |
| | Contingencies ............ | .. | ......... | .... | 96 55 | |
| | | | | | | 492 95 |
| | *Listowel.* | | | | | |
| Male, Thos.. .... | Salary as Inspector for year.......... | .... | ........ | 3 60 | 96 40 | |
| | Contingencies .... ... | .. | ........ | ....... | 75 10 | |
| | | | | | | 171 50 |
| | *London.* | | | | | |
| Nash, A. F.... .. | Salary as Inspector for year.... .... | ..... | ......... | 3 60 | 1,096 40 | |
| | Contingencies....... ... .... | ... | ....... | ...... | 516 23 | |
| | | | | | | 1,612 63 |

## APPENDIX B—*Continued.*

### No. 6.—Details of Gas Inspection Expenditures, 1902-1903—*Continued.*

| To whom paid. | Service. | Deductions for Retirement. | Deductions for Superannuation. | Deductions for Guarantee. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|---|---|
| | *Napanee.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Johnston, W | Contingencies for year | | | | | 35 70 |
| | *Ottawa.* | | | | | |
| Roche, H. G. | Salary as Inspector for year | | | 3 60 | 1,046 40 | |
| | Contingencies | | | | 930 85 | |
| | | | | | | 1,977 25 |
| | *Owen Sound.* | | | | | |
| Graham, W. J. | Salary as Inspector for year | | 4 00 | 3 60 | 192 40 | |
| | Contingencies | | | | 125 00 | |
| | | | | | | 317 40 |
| | *Peterborough.* | | | | | |
| Rork, Thos | Salary as Inspector for year | | | 3 60 | 146 40 | |
| | Contingencies | | | | 2 00 | |
| | | | | | | 148 40 |
| | *Sarnia.* | | | | | |
| Hicks, W. H. | Salary as Inspector for year | | | 1 80 | 98 20 | |
| | Contingencies | | | | 21 25 | |
| | | | | | | 119 45 |
| | *Stratford.* | | | | | |
| Rennie, Geo | Salary as Inspector for year | | 4 00 | 3 60 | 192 40 | |
| | Contingencies | | | | 14 85 | |
| | | | | | | 207 25 |
| | *Toronto.* | | | | | |
| Johnstone, J. K. | Salary as Inspector for year | | 34 04 | 3 60 | 1,662 36 | |
| Pape, Jas. | " Asst. " " | | | 1 80 | 998 16 | |
| Whyte, J. A. | " " " " | | | 1 80 | 648 12 | |
| | Salaries | | 34 04 | 7 20 | 3,308 64 | |
| | Contingencies | | | | 57 98 | |
| | | | | | | 3,366 62 |
| | *Montreal.* | | | | | |
| Aubin, A. | Salary as Inspector for year | | | 3 60 | 1,496 40 | |
| O'Flaherty, M. J. | " Asst. " " | | | 1 80 | 798 12 | |
| | Salaries | | | 5 40 | 2,294 52 | |
| | Contingencies | | | | 817 60 | |
| | | | | | | 3,112 12 |
| | *Quebec.* | | | | | |
| LeVasseur, N. | Salary as Inspector for year | | 19 96 | 3 60 | 976 44 | |
| Moreau, A. | " Asst. " " | | 6 00 | | 294 00 | |
| | Salaries | | 25 96 | 3 60 | 1,270 44 | |
| | Contingencies | | | | 157 46 | |
| | | | | | | 1,427 90 |
| | *Sherbrooke.* | | | | | |
| Simpson, A. F. | Salary as Inspector for year | | 3 00 | 3 60 | 143 40 | 143 40 |
| | *St. Hyacinthe.* | | | | | |
| Benoit, L. V. | Salary as Inspector for year | | | 1 80 | 98 20 | 98 20 |

## APPENDIX B—*Continued.*

### No. 6—DETAILS of Gas Inspection Expenditures, 1902–1903—*Continued.*

| To whom paid. | Service. | Deductions for Retirement. | Deductions for Superannuation. | Deductions for Guarantee. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|---|---|
| | *Fredericton.* | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Fowler, J. D. | Salary as Inspector for year | | | 3 60 | 196 40 | 196 40 |
| | *St. John, N.B.* | | | | | |
| Wilson, J. E. | Salary as Inspector for year | | | 3 60 | 1,096 40 | |
| | Contingencies | | | | 84 69 | |
| | | | | | | 1,181 09 |
| | *Halifax.* | | | | | |
| Miller, A. | Salary as Inspector for year | | 25 04 | 3 60 | 1,221 36 | |
| Ritchie, A. J. | " Asst. " " | | | 1 80 | 548 16 | |
| Munro, H. D. | " " " " | | 1 96 | 1 80 | 96 24 | |
| | Salaries | | 27 00 | 7 20 | 1,865 76 | |
| | Contingencies | | | | 755 75 | |
| | | | | | | 2,621 51 |
| | *Charlottetown.* | | | | | |
| Bell, J. H. | Salary as Inspector for year | | | 3 60 | 296 40 | |
| | Contingencies | | | | 19 82 | |
| | | | | | | 316 22 |
| | *Winnipeg.* | | | | | |
| Magness, R. | Salary as Inspector for year | | | 3 60 | 296 40 | |
| | Contingencies | | | | 131 70 | |
| | | | | | | 428 10 |
| | *Nanaimo.* | | | | | |
| McAloney, J. A. | Salary as Inspector for year | | | 3 60 | 96 40 | 96 40 |
| | *New Westminster.* | | | | | |
| Wolfenden, W. | Salary as Inspector for year | 5 00 | | 3 60 | 91 40 | |
| | Contingencies | | | | 23 85 | |
| | | | | | | 115 25 |
| | *Vancouver.* | | | | | |
| Miller, J. E. | Salary as Inspector for year | | 6 00 | 3 60 | 290 40 | |
| | Contingencies | | | | 131 85 | |
| | | | | | | 422 25 |
| | *Victoria.* | | | | | |
| Jones, R. | Salary as Inspector for year | | 4 00 | 3 60 | 192 40 | |
| | Contingencies | | | | 10 00 | |
| | | | | | | 202 40 |
| | *General.* | | | | | |
| McPhie, D. | Contingencies | | | | | 902 70 |

## APPENDIX B—*Continued.*

### No. 6.—Details of Gas Inspection Expenditures for the Year ended June 30, 1903—*Concluded.*

| To Whom Paid. | Service. | Amounts paid. | Total Amounts paid. |
|---|---|---|---|
| | *General Contingencies.* | $ cts. | $ cts. |
| American Bank Note Co. | Stamps supplied | 200 00 | |
| Stevenson, Geo. | Paid on account of 2 meter provers | 200 00 | |
| Negretti & Zambra | Flasks, glasses, condensers and repairs | 70 82 | |
| Canadian Rubber Co. | Rubber tubing | 23 88 | |
| The Pritchard & Andrews Co. | Stamps and repairs | 3 25 | |
| | Total general contingencies | | 497 95 |
| | Grand total | | 24,488 34 |
| | Add—Printing | 584 78 | |
| | Stationery | 211 24 | |
| | | | 796 02 |
| | Authorized disbursements (less superannuation, retirement and guarantee) | | 25,284 36 |
| | Add—Balances due by inspectors, June 30, 1903 | | 212 88 |
| | | | 25,497 24 |
| | Less—Balances due by inspectors, July 1, 1902 | | 212 88 |
| | Actual disbursements agreeing with Statement No. 22, page 58 | | 25,284 36 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## APPENDIX B *Continued.*

### No. 7—Details of Electric Light Inspection. Expenditures for the Year ended June 30, 1903.

| To whom paid. | Service. | Deduction for Guarantee | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|
| | *Belleville.* | $ cts. | $ cts. | $ cts. |
| Johnson, W | Contingencies | | | 290 43 |
| | *Hamilton.* | | | |
| McPhie, D. | Contingencies | | | 85 25 |
| | *London.* | | | |
| Nash, A. F. | Contingencies | | | 194 29 |
| | *Owen Sound.* | | | |
| Graham, W. J | Contingencies | | | 2 50 |
| | *Toronto.* | | | |
| Johnstone, J. K | Contingencies | | | 239 63 |
| | *Montreal.* | | | |
| Aubin, A | Contingencies | | | 424 90 |
| | *Quebec.* | | | |
| Le Vasseur, N. | Contingencies | | | 74 42 |
| | *Sherbrooke.* | | | |
| Simpson, A. F | Contingencies | | | 74 97 |
| | *St. Hyacinthe.* | | | |
| Fontaine, A | Salary as Inspector from July 1 to Oct. 8, 1902 | 0 45 | 74 55 | |
| Provost, I | " " Oct. 9, 1902, to June 30, 1903 | 1 35 | 223 65 | |
| | Salaries | 1 80 | 298 20 | |
| | Contingencies | | 48 20 | |
| | | | | 346 40 |
| | *Three Rivers.* | | | |
| Dufresne, J. U | Salary as Inspector from Aug. 1, 1902, to June 30, 1903 | 1 65 | 456 61 | |
| | Contingencies | | 63 87 | |
| | | | | 520 48 |
| | *St. John, N.B.* | | | |
| Wilson, J. E | Contingencies | | | 137 58 |
| | *Halifax.* | | | |
| Miller, A | Contingencies | | | 246 75 |

## APPENDIX B—*Continued.*

### No. 7.—Details of General Electric Light Inspection, Expenditures for the Year ended June 30, 1903—*Concluded.*

| To whom paid. | Service. | Deduction for Guarantee | Amounts paid. | Total Amounts paid. |
|---|---|---|---|---|
| | *Charlottetown.* | $ cts. | $ cts. | $ cts. |
| Bell, J. H | Contingencies | | | 30 53 |
| | *Victoria.* | | | |
| Jones, R | Contingencies | | | 48 15 |
| | *General.* | | | |
| Higman, O | Salary as Chief Electrical Engineer for year | | 2,400 00 | |
| Fontaine, A | Salary as Asst. to the Chief Electrical Engineer from Oct. 9, 1902, to June 30, 1903 | | 364 19 | |
| | Salaries | | 2,764 19 | |
| | Contingencies | | 368 23 | |
| | | | | 3,132 42 |
| | *General Contingencies.* | | | |
| Ahearn & Soper | Electrical supplies, materials, repairs, &c | | 1,563 79 | |
| Shedrick, C. E | " " " | | 117 39 | |
| Sproule, W. H | To pay for 8 watches | | 80 00 | |
| The Pritchard & Andrews Co | Steel punches | | 2 00 | |
| May, G. & Son | 1 leather valise | | 14 50 | |
| Keuffel Esser Co | 1 drawing table | | 13 70 | |
| Lyman, Son & Co | Sulphuric acid | | 7 58 | |
| Canadian Rubber Co | Rubber tubing | | 6 42 | |
| The Ottawa Electric Co | 18 lamps | | 8 88 | |
| The Electric Storage Battery Co | Bolt connectors, &c | | 14 97 | |
| Weston Electrical Instrument Co | Repairs and electrical supplies | | 9 21 | |
| Mills, A. K. & Son | 7 pieces of marble | | 6 90 | |
| The Packard Electric Co | 36 lamps and box | | 12 75 | |
| Haszard, F. S | Law costs *re* Rex *vs.* Charlottetown Light & Power Co. | | 8 50 | |
| Canadian Pacific Ry. Co. | Freight | | 6 94 | |
| Canadian Express Co | Express charges | | 28 88 | |
| Dominion Express Co | " | | 36 73 | |
| | Total general contingencies | | | 1,939 05 |
| | Grand total | | | 7,787 75 |
| | Add—Printing | | 689 55 | |
| | Stationery | | 19 99 | |
| | | | | 709 54 |
| | Actual disbursements, agreeing with Statement No. 24, page 61 | | | 8,497 29 |

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

## APPENDIX B—*Continued.*

### No. 8.—List of Persons employed by the Inland Revenue Department on Salary, during the Year ended June 30, 1903.

| Names. | Services. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inside. | Excise. | Weights and Measures. | Gas. | Electric Light Inspection. | Preventive. | Food Inspection. |
| Adams, J. S | | 1 | | | | | |
| Alexander, Thos. | | 1 | | | | | |
| Allen, G. A | | 1 | | | | | |
| Alteman, Peter J | | 1 | | | | | |
| Amor, Wm | | 1 | | | | | |
| Andrews, A. A. | | 1 | | | | | |
| Armstrong, Walter | | 1 | | | | | |
| Aubin, A | | | | 1 | 1 | | |
| Baby, W. A. D | | 1 | | | | | |
| Baikie, D | | 1 | | | | | |
| Baker, J. S. | | | 1 | | | | |
| Barber, J. S. | | 1 | | | | | |
| Barnes, G. | | 1 | | | | | |
| Barrett, J. K. | | 1 | | | | | |
| Bayard, Gilbert A. | | 1 | | | | | |
| Beaulac, J. H | | | 1 | | | | |
| Beaulieu, J. B. | | 1 | | | | | |
| Behan, J. J | | | 1 | 1 | | | |
| Belair, A. (Plessis dit) | | 1 | | | | | |
| Bell, James E | | 1 | | | | | |
| Bell, J. H. | | | | 1 | 1 | | |
| Belleperche, A. J. E | | 1 | | | | | |
| Belyea, T. H | | 1 | | | | | |
| Bennett, James | | 1 | | | | | |
| Benoit, L. V. | | 1 | | 1 | | | |
| Bernard, N. J. D | | 1 | | | | | |
| Bernier, J. A | | | 1 | | | | |
| Berry, H. L. | | 1 | | | | | |
| Bickle, J. W | | 1 | | 1 | | | |
| Bish, Philip | | 1 | | | | | |
| Bishop, J. B. | | 1 | | | | | |
| Blackman, C. | | 1 | | | | | |
| Blethen, C. W | | 1 | | | | | |
| Blyth, Alex. | | 1 | | | | | |
| Boomer, J. B | | 1 | | | | | |
| Bouchette, R. E | 1 | | | | | | |
| Boudet, E | | | 1 | | | | |
| Bourassa, Joseph. | | 1 | | | | | |
| Bourgault, Alph. | 1 | | | | | | |
| Bourget, O | | 1 | | | | | |
| Bousquet, J. O | | 1 | | | | | |
| Bouteiller, G. A | | 1 | | | | | |
| Bowman, Allan | | 1 | | | | | |
| Boyd, J. F. S. | | 1 | | | | | |
| Boyd, S. I. | | 1 | | | | | |
| Boyle, P. | | 1 | | | | | |
| Bowen, F. C. | | 1 | | | | | |
| Brabant, J. B. G. N | | 1 | | | | | |
| Brain, A. F. | | 1 | | | | | |
| Breen, John | | | 1 | | | | |
| Brennan, D. J. | | 1 | | | | | |
| Brennan, John. | | 1 | | | | | |
| Brentnall, F. F | | 1 | | | | | |
| Broadfoot, S | | 1 | | 1 | | | |
| Brown, W. J | | 1 | | | | | |
| Browne, G. W | | 1 | | | | | |
| Bruyere, H. P. | | 1 | | | | | |
| Burgess, Thomas H | | | 1 | | | | |
| Burke, T | | 1 | | | | | |
| Burns, John | 1 | | | | | | |

## APPENDIX B—*Continued.*

## No. 8.—List of Persons employed by the Inland Revenue Department, 1902–1903—*Continued.*

| Names. | Services. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inside. | Excise. | Weights and Measures. | Gas. | Electric Light Inspection. | Preventive. | Food Inspection. |
| Burns, R. J | | 1 | | | | | |
| Cahill, J. H | | 1 | | | | | |
| Cahill, J. W. | | 1 | | | | | |
| Cameron, D. M | | 1 | | | | | |
| Campeau, F. R. E | 1 | | | | | | |
| Cargill, W. | | 1 | | | | | |
| Carroll, D. | | 1 | | | | | |
| Carroll, F. P. | | 1 | | | | | |
| Carter, William | 1 | | | | | | |
| Caven, A | | 1 | | | | | |
| Caven, W | | 1 | | | | | |
| Chalus, J. O | | | 1 | | | | |
| Charbonneau, E | 1 | | | | | | |
| Chartier, Etienne | | 1 | | | | | |
| Cheseldine, J. H. | | 1 | | | | | |
| Chevrier, B | 1 | | | | | | |
| Chilver, F. W | | 1 | | | | | |
| Chisholm, J. J. | | | 1 | | | | |
| Chisholm, W. N. | | 1 | | | | | |
| Clark, A. F | | 1 | | | | | |
| Clark, James Alfred | | 1 | | | | | |
| Clarke, Thomas | | 1 | | | | | |
| Codd, Herbert J. S | | 1 | | | | | |
| Code, Abraham | | 1 | | | | | |
| Coleman, Charles | | 1 | | | | | |
| Coleman, J. J | | 1 | | | | | |
| Coles, F. H | | 1 | | | | | |
| Collins, D | | | 1 | | | | |
| Comte, L. A. A. J | | 1 | | | | | |
| Conklin, W. M | | 1 | | | | | 1 |
| Cook, W. R | | 1 | | | | | |
| Costello, J. W. | | | 1 | | | | |
| Costigan, J. J | | 1 | | | | | 1 |
| Coughlin, D. | | | 1 | | | | |
| Coulter, Alex | | 1 | | | | | |
| Courtney, J. J. | | 1 | | | | | |
| Coutts, J. J. | | 1 | | | | | |
| Cowan, Edgar | | | 1 | | | | |
| Crawford, W. P. | | 1 | | | | | |
| Crowe, W. | | 1 | | | | | |
| Dager, H. J. | | 1 | | | | | |
| Daoust, J. A. | | | 1 | | | | |
| Daveluy, J. P. | | 1 | | | | | |
| David, T | | 1 | | | | | |
| Davis, J | | 1 | | | | | |
| Davis, T. G. | | 1 | | | | | |
| Davy, Edward | | | 1 | | | | |
| Dawson, W. | | 1 | | | | | |
| Deland, A. N | | 1 | | | | | |
| Dennis, W. A. | | | | 1 | | | |
| Desaulniers, J. E. A | | 1 | | | | | |
| Dessert, Victor | | | 1 | | | | |
| Dibblee, William | | 1 | | | | | |
| Dick, J. W | | 1 | | | | | |
| Dickson, C. T | | 1 | | | | | |
| Dingman, N. J | | 1 | | | | | |
| Dixon, H. G. S | | 1 | | | | | |
| Donaghy, William | | 1 | | | | | |
| Doyle, B. J | | 1 | | | | | |
| Doyon, J. A | 1 | | | | | | |

## APPENDIX B.—*Continued.*

### No. 8. List of Persons employed by the Inland Revenue Department, 1902 1903—*Continued.*

| Names. | Services. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inside. | Excise. | Weights and Measures. | Gas. | Electric Light Inspection. | Preventive. | [illegible] Food Inspection. |
| Dudley, W. H | | 1 | | | | | |
| Dumaine, J. D. E. | | 1 | | | | | |
| Dumbrille, R. W. | | 1 | | | | | |
| Dumouchel, Léandre | | 1 | | | | | |
| Dunlop, C | | 1 | | | | | |
| Dunne, J. P. | 1 | | | | | | |
| Duplessis, C. Z | | 1 | | | | | |
| Dustan, W. M | | | 1 | | | | |
| Dwyre, D. T. | | 1 | | | | | |
| Egan, Wm. | | 1 | | | | | |
| Egener, A | | 1 | | | | | |
| Elliott, T. H. | | 1 | 1 | | | | |
| Errett, R. W | | | 1 | | | | |
| Evans, G. T | | 1 | | | | | |
| Fahey, Ed. | | 1 | | | | | |
| Falconer, James | | 1 | | | | | |
| Falconer, R. H | | 1 | | | | | |
| Ferguson, J. | | 1 | | | | | |
| Ferguson, John C | | 1 | | | | | 1 |
| Findley, Hugh | | | 1 | | | | |
| Fitzgerald, E. W. | | | 1 | | | | |
| Fitzpatrick, W. J. | | 1 | | | | | |
| Fletcher, R. W. | | 1 | | | | | 1 |
| Floody, E | | | | | | 1 | |
| Flynn, D. J | | 1 | | | | | |
| Fontaine, A. | | | | | 1 | | |
| Forest, E. R | | 1 | | | | | |
| Forest, M | | 1 | | | | | |
| Fortier, J. J. O | | 1 | | | | | |
| Fortier, V | | 1 | | | | | |
| Foster, J. Henry. | | 1 | | | | | |
| Fournier, L. A. | | | 1 | | | | |
| Fowler, George | 1 | | | | | | |
| Fowler, J. D. | | | | 1 | | | |
| Fox, J. D | | 1 | | | | | |
| Fox, Thomas | | 1 | | | | | |
| Frame, Archibald | | | 1 | | | | |
| Frankland, H. R. | | 1 | | | | | |
| Fraser, P. | | 1 | | | | | |
| Freed, A. T | | | 1 | | | | |
| Freeland, Anthony. | | 1 | | | | | |
| Gauvin, E | | 1 | | | | | |
| Geldart, O. A. | | 1 | | | | | |
| George, John | | 1 | | | | | |
| Gerald, C. | | 1 | | | | | |
| Gerald, W. H. | | 1 | | | | | |
| Gerald, W. J | 1 | | | | | | |
| Gervais, Samuel. | | | 1 | | | | |
| Gill, Wm | | 1 | | | | | |
| Girard, Irené | | 1 | | | | | |
| Girdlestone, R. J. M. | | 1 | 1 | | | | |
| Goodman, A. W | | 1 | | | | | |
| Gorman, Arthur M. | | 1 | | | | | |
| Gosnell, T. S | | 1 | | | | | |
| Gow, J. E | | 1 | | | | | |
| Graham, A. L. | | 1 | | | | | |
| Graham, W. J | | 1 | | 1 | | | |
| Graham, W. T. | | 1 | | | | | |
| Grant, H. H | | 1 | | | | | |
| Gravel, A. L. | | | 1 | | | | |

## APPENDIX B.—*Continued.*

### No. 8. LIST of Persons employed by the Inland Revenue Department, 1902-1903—*Continued.*

| Names. | Service. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inside. | Excise. | Weights and Measures. | Gas. | Electric Light Inspection. | Preventive. | Food Inspection. |
| Grimason, Thomas | | 1 | | | | | |
| Grobois (de), Chas. B. | | 1 | | | | | |
| Guay, Alphonse | | | 1 | | | | |
| Guay, G. N. | | | 1 | | | | |
| Hagan, James | | 1 | | | | | |
| Hagarty, P | | 1 | | | | | |
| Hagerty, B | 1 | | | | | | |
| Halliday, W. A | 1 | | | | | | |
| Hanley, A | | 1 | | | | | |
| Harwood, J. O. A | | 1 | | | | | |
| Harris, J. G. | | 1 | | | | | |
| Harrison, W. F. | | 1 | | | | | |
| Hart, P. D. | | 1 | | | | | |
| Hawkin, A. C. | | 1 | | | | | |
| Hawkins, W. L. | | 1 | | | | | |
| Hayhurst, T. H | | 1 | | | | | |
| Hayward, W. J. | | | 1 | | | | |
| Hébert, C. D | | 1 | | | | | |
| Hébert, J. A. P. | | | 1 | | | | |
| Helliwell, H. N | | 1 | | | | | |
| Henderson, W | | 1 | | | | | |
| Henwood, George | | 1 | | | | | |
| Hesson, C. A | | 1 | | | | | |
| Hicks, W. H | | 1 | | 1 | | | |
| Higman, O | | | | | 1 | | |
| Himsworth, Wm. | 1 | | | | | | |
| Hinchey, E. H. | | 1 | | | | | |
| Hobbs, G. N. | | 1 | | | | | |
| Hodder, W. E. | | 1 | | | | | |
| Howard, W. W. S. | | 1 | | | | | |
| Howden, R. | | 1 | | | | | |
| Howell, Thomas | | 1 | | | | | |
| Howie, A. | | 1 | | | | | |
| Hubley, H. H | | 1 | | | | | |
| Hudon, L. E. | 1 | | | | | | |
| Hughes, Henry | | | 1 | | | | |
| Hughes, P. A | 1 | | | | | | |
| Hughes, R. A. | | | 1 | | | | |
| Hurst, Levi B | | 1 | | | | | |
| Iler, B. | | 1 | | | | | |
| Ironside, G. A | | 1 | | | | | |
| Irwin, Robert | | 1 | | | | | |
| Irwin, Samuel | | | 1 | | | | |
| James, T. C. | | 1 | | | | | |
| Jameson, S. B. | | 1 | | | | | |
| Jamieson, R. C | | 1 | | | | | |
| Jarvis, Henry | | | 1 | | | | |
| Johnson, C. W. | | | | 1 | | | |
| Johnson, J. J. | | 1 | | | | | |
| Johnson, Wm. | | | 1 | 1 | 1 | | |
| Johnston, G. E | | 1 | | | | | |
| Johnstone, J. K | | | | 1 | 1 | | |
| Jones, Andrew | | 1 | | | | | |
| Jones, Richard | | 1 | | 1 | 1 | | |
| Jubenville, J. P. | | 1 | | | | | |
| Kearny, D. J | | 1 | | | | | |
| Keeler, G. S | | 1 | | | | | |
| Keilty, T | | 1 | | | | | |
| Kelly, Daniel | | | 1 | | | | |
| Kelly, J. F. | | | | | | 1 | |

## APPENDIX B—*Continued.*

### No. 8.—List of Persons employed by the Inland Revenue Department, 1902–1903—*Continued.*

| Names. | Services. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inside. | Excise. | Weights and Measures. | Gas. | Electric Light Inspection. | Preventive. | Food Inspection. |
| Kelly, M. J. | | | 1 | | | | |
| Kenning, J. H. | | 1 | | | | | |
| Keogh, P. M | | 1 | | | | | |
| Kidd, Thomas | | | | | | | 1 |
| Kilroy, E. T. | | 1 | | | | | |
| King, R. M. | | 1 | | | | | |
| Knowles, C. | | | 1 | | | | |
| Labelle, L. V | | 1 | | | | | |
| Laidman, Richard H. | | | 1 | | | | |
| Lambert, J. A. | | 1 | | | | | |
| Lane, T. M. | | 1 | | | | | |
| Laporte, Geo | | 1 | | | | | |
| LaRivière, A. C | | 1 | | | | | |
| LaRue, A. P | | 1 | | | | | |
| LaRue, George | | 1 | | | | | |
| LaRue, J. B. Alexandre | | 1 | | | | | |
| Laurier, J. L. | | 1 | | | | | |
| Lawless, E. M. | 1 | | | | | | |
| Lawlor, H. | | 1 | | | | | |
| Lawlor, John J | | 1 | | | | | |
| Lawrence, G. C | | | 1 | | | | |
| LeBel, J. A. W. | | | 1 | | | | |
| Lee, Edward | | 1 | | | | | |
| LeMoine, Jules | | 1 | | | | | |
| Lépine, Louis | | 1 | | | | | |
| LeVasseur, N. | | | | 1 | 1 | | |
| Levêque, Hector | | | | | | | 1 |
| Logan, John | | 1 | | | | | |
| Long, W. H. A | | 1 | | | | | |
| Lyons, E | | 1 | | | | | |
| Macdonald, A. B. | | 1 | | | | | |
| Macdonald, J. A. | | | 1 | | | | |
| Macfarlane, Thos | | | | | | | 1 |
| MacKenzie, J. H | | 1 | | | | | |
| Mager, Joseph G | | | 1 | | | | |
| Magness, Robt. | | | 1 | 1 | 1 | | |
| Mahoney, H | | 1 | | | | | |
| Mainville, C. P. | | 1 | | | | | |
| Male, Thomas | | | | 1 | | | |
| Malo, T. | | 1 | | | | | |
| Maranda, N. A | | 1 | | | | | |
| Marcon, F. E | | 1 | | | | | |
| Marentette, Alex | | | 1 | | | | |
| Marin, L. H | | 1 | | | | | |
| Marion, H. R. | | 1 | | | | | |
| Mason, F | | 1 | | | | | |
| Maurice, E. | | 1 | | | | | |
| Metcalf, W. F. | | 1 | | | | | |
| Michon, A. E | | 1 | | | | | |
| Miller, A | | | | 1 | 1 | | |
| Miller, J. E | | 1 | | 1 | 1 | | |
| Miller, W. F. | | 1 | | | | | |
| Millier, Elie | | 1 | | | | | |
| Milligan, R. J. | | | 1 | | | | |
| Milliken, E. | | 1 | | | | | |
| Moore, T | | 1 | | | | | 1 |
| Moreau, A. | | 1 | | | | | |
| Morin, J. P. | | | 1 | | | | |
| Moreau, J. A | | | 1 | 1 | | | |
| Mulhern, M. M | | 1 | | 1 | | | |

## APPENDIX B—*Continued.*

### No. 8.—List of Persons employed by the Inland Revenue Department, 1902–1903—*Continued.*

| Names. | Services. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inside. | Excise. | Weights and Measures. | Gas. | Electric Light Inspection. | Preventive. | Food Inspection. |
| Munro, H. D | | 1 | | 1 | | | |
| Murdoch, James | | | 1 | | | | |
| Murray, A. E | | 1 | | | | | |
| Murray, David | | 1 | | | | | |
| McAloney, Joseph A. | | 1 | 1 | 1 | | | |
| McArthur, G. H | | 1 | | | | | |
| McCloskey, J. R. | | 1 | | | | | |
| McCoy, Wm. | | 1 | | | | | |
| McCraney, H. P. | | 1 | | | | | |
| McCuaig, Aug. F | | 1 | | | | | |
| McCullough, A | 1 | | | | | | |
| McCutcheon, H | | 1 | | | | | |
| McDonald, A. J. | | 1 | | | | | |
| McDonald, A. W | | | 1 | | | | |
| McDonald, J | | | 1 | | | | |
| McFarland, C. D | | 1 | | | | | |
| McFarlane, J | | | 1 | | | | |
| McFee, C. | | 1 | | | | | |
| McGill, A. | | | | | | | 1 |
| McGuire, T. | | 1 | | | | | |
| McLenaghan, N. | | 1 | | | | | |
| McNiven, J. D. | | 1 | | | | | |
| McPhie, Donald | | | | 1 | 1 | | |
| McPhie, W. H. | | | | 1 | | | |
| McSween, James | | 1 | | | | | |
| Nash, A. F. | | | | 1 | 1 | | |
| Neil, James | | 1 | | | | | |
| Nash, S. C. | | 1 | | | | | |
| Newby, F. | 1 | | | | | | |
| Nichols, J. T. | | 1 | | | | | |
| Noonan, H. T | | 1 | | | | | |
| Normandin, G. | | 1 | | | | | |
| O'Brien, E. C. | | 1 | | | | | |
| O'Brien, James | | 1 | | | | | |
| O'Brien, J. F. | | 1 | | | | | |
| O'Donnell, J. | | 1 | | | | | |
| O'Donnell, M. J. | | 1 | | | | | |
| O'Donohue, M. J | | 1 | | | | | |
| O'Flaherty, E. J. | | 1 | | | | | |
| O'Flaherty, M. J | | | | 1 | | | |
| O'Leary, T. J. | | 1 | | | | | |
| Orr, Henry N | | 1 | | | | | |
| Osborne, F. A. | | 1 | | | | | |
| O'Sullivan, D | | 1 | | | | | |
| Panneton, G. E | | 1 | | | | | |
| Pape, James | | | | 1 | 1 | | |
| Parent, F. | | 1 | | | | | |
| Parker, Thomas | | | 1 | | | | |
| Parkinson, Edward B. | | 1 | | | | | 1 |
| Parson, C. H | | 1 | | | | | |
| Patry, J. H | | 1 | | | | | |
| Patterson, C. E. A | | 1 | | | | | |
| Pelletier, N. G. | | 1 | | | | | |
| Petit, J. B. | | | 1 | | | | |
| Poirier, J. N. | | 1 | | | | | |
| Pole, C. W | | 1 | | | | | |
| Potvin, Napoléon | 1 | | | | | | |
| Powell, J. B | | 1 | | | | | |
| Power, J. F. | | 1 | | | | | |
| Préfontaine, F. H. | | | 1 | | | | |

## APPENDIX B.—*Continued.*

### No. 8.—LIST of Persons employed by the Inland Revenue Department, 1902-1903—*Continued.*

| NAMES. | SERVICES. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inside. | Excise. | Weights and Measures. | Gas. | Electric Light Inspection. | Preventive. | Food Inspection. |
| Prosser, Elijah | | | | | | 1 | |
| Quain, Redmond | 1 | | | | | | |
| Quinn, J. D. | | 1 | | | | | |
| Ralston, T. | | 1 | | | | | |
| Renaud, A. H. | | 1 | | | | | |
| Rennie, George | | 1 | | 1 | | | |
| Richard, D. | | | 1 | | | | |
| Ridgman, A. H | | 1 | | | | | |
| Rinfret, C. I. | | 1 | | | | | |
| Ritchie, A. J. | | | | 1 | | | |
| Robins, S. W | | | 1 | | | | |
| Robinson, R. S | | 1 | | | | | |
| Roche, H. G. | | | | 1 | 1 | | |
| Rork, T. | | 1 | | 1 | | | |
| Ross, H. E. | | 1 | 1 | | | | |
| Rouleau, J. C., jun | | 1 | | | | | 1 |
| Rousseau, Elzéar H | | 1 | | | | | |
| Rowan, W. E. | | 1 | | | | | |
| Roy, L. G. | 1 | | | | | | |
| Rudkins, W. | | 1 | | 1 | 1 | | |
| Ryan, Wm | | 1 | | | | | |
| Saucier, X. | | 1 | | | | | 1 |
| Schram, R. L. H. | | 1 | | | | | |
| Scullion, W. J | | 1 | | | | | |
| Shanacy, M | | 1 | | 1 | | | |
| Shaw, J. F | 1 | | | | | | |
| Simpson, A. F. | | 1 | | 1 | 1 | | |
| Simpson, W. A | | 1 | | | | | |
| Simon, E. H | | 1 | | | | | |
| Slattery, R | | 1 | | | | | |
| Slattery, Thomas | | | 1 | | | | |
| Sloan, W | | 1 | | | | | |
| Smith, J. C. | | | 1 | | | | |
| Snowdon, J. W | | 1 | | | | | |
| Sparling, J. W | | 1 | | | | | |
| Spence, F. H | | 1 | | | | | |
| Spereman, J. J | | 1 | | | | | |
| Standish, J. G | | 1 | | | | | |
| Stevens, D. B. | | 1 | | | | | |
| Stewart, James | | 1 | | | | | |
| St. Michel, F. X. | | 1 | | | | | |
| Stratton, W. C. | | 1 | | | | | |
| Stuart, W. E. | | | | 1 | | | |
| Swannell, F. W | | 1 | | | | | |
| Talbot, John | | 1 | | | | | |
| Taylor, G. W | | 1 | | | | | |
| Têtreault, J. | | 1 | | | | | |
| Thomas, J. S. | | | 1 | | | | |
| Thomas, Robert | | 1 | | | | | |
| Thorburn, J. | | 1 | | | | | |
| Till, T. M | | 1 | | | | | |
| Timmons, P | | 1 | | | | | |
| Tomlinson, W. M | | | 1 | | | | |
| Tompkins, P. | | 1 | | | | | |
| Toupin, F. X. J. A | | 1 | | | | | |
| Tracy, J. P. | | 1 | | | | | |
| Trasher, W. A | | 1 | | | | | |
| Valin, J. E. | 1 | | | | | | |
| Verner, Francis | | 1 | | | | | |
| Verner, Thomas H | | 1 | | | | | |

## APPENDIX B—*Continued.*

### No. 8.—LIST of Persons employed by the Inland Revenue Department, 1902 1903—*Concluded.*

| Names. | Services. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Inside. | Excise. | Weights and Measures. | Gas. | Electric Light Inspection. | Preventive. | Food Inspection. |
| Wainright, F. G. | | 1 | | | | | |
| Waller, J | | 1 | | | | | |
| Walsh, Daniel J. | | 1 | | | | | |
| Wardell, R. S. R. | | 1 | | | | | |
| Watson, W. W. | | 1 | | | | | |
| Waugh, R. J. | | | 1 | | | | 1 |
| Webbe, C. E. A | | 1 | | | | | |
| Weir, James | | 1 | | | | | |
| Westman, T. | 1 | | | | | | |
| Weyms, C. | | 1 | | | | | |
| Wheatley, Alfred E | | | 1 | | | | |
| White, J. B. | | 1 | | | | | |
| Whitehead, J. P. | | 1 | | | | | |
| Whyte, J. A. | | | | 1 | | | |
| Wilson, David | | 1 | | | | | |
| Wilson, J. E. | | | | 1 | 1 | | |
| Winsor, John A | | | 1 | | | | |
| Wolfenden, William | | 1 | | 1 | | | |
| Wood, James A. | | 1 | | | | | |
| Woodward, G. W | | 1 | | | | | |
| Wright, Robert J. | | | 1 | | | | |
| Wright, S. E. | | | | | | | 1 |
| Yetts, R. P. | 1 | | | | | | |
| Young, R. E. | | 1 | | | | | |
| Totals. | 26 | 326 | 68 | 39 | 18 | 3 | 14 |

## APPENDIX B—*Continued.*

### No. 9.—LIST of Persons employed by the Inland Revenue Department on Salary, during a portion of the Year ended June 30, 1903.

| Names. | Period. | Services. Excise. | Weights and Measures. | Electric Light Inspection. | Preventive. | Adulteration of Food. |
|---|---|---|---|---|---|---|
| Barry, James | From May 30, 1903, to June 30, 1903 | | 1 | | | |
| Basinet, Louis | " July 1, 1902, to July 21, 1902 | 1 | | | | |
| Beneteau, S. | " January 1, 1903, to June 30, 1903 | 1 | | | | |
| Blais, J. C. F. | " June 1, 1903, to June 30, 1903 | 1 | | | | |
| Bolduc, Ephrem | " August 1, 1902, to June 30, 1903 | | 1 | | | |
| Bonner, J. D. | " July 17, 1902, to June 30, 1903 | | | | 1 | |
| Bourget, L. J. | " January 7, 1903, to June 30, 1903 | | 1 | | | |
| Casey, John | " July 1, 1902, to March 31, 1903 | | | | 1 | |
| Casey, John | " April 1, 1903, to June 30, 1903 | 1 | | | | |
| Chabot, F. H. | " July 1, 1902, to September 30, 1902 | | 1 | | | |
| Chagnon, C. P. | " April 6, 1903, to June 30, 1903 | 1 | | | | |
| Cram, J. W. | " February 4, 1903, to March 31, 1903 | 1 | | | | |
| Crotty, John | " July 1, 1902, to December 31, 1902 | 1 | | | | |
| Daigneault, G. | " July 22, 1902, to June 30, 1903 | 1 | | | | |
| Dufresne, J. U. | " August 1, 1902, to June 30, 1903 | | | 1 | | |
| Findlay, R. | " March 2, 1903, to June 30, 1903 | | 1 | | | |
| Fontaine, A. | " October 9, 1902, to June 30, 1903 | | | 1 | | |
| Fyfe, James | " October 13, 1902, to June 30, 1903 | | 1 | | | |
| Gamache, J. H. | " July 22, 1902, to June 30, 1903 | 1 | | | | |
| Gerow, W. M. | " April 1, 1903, to June 30, 1903 | 1 | | | | |
| Lamoureux, J. A. | " June 6, 1903, to June 30, 1903 | 1 | | | | |
| Macintyre, D. | " July, 1, 1902, to March 31, 1903 | 1 | | | | |
| Marshall, I. N. | " January 1, 1903, to June 30, 1903 | 1 | | | | |
| Murphy, Jas. L. | " June 1, 1903, to June 30, 1903 | 1 | | | | |
| Portelance, P. A. | " September 3, 1902, to June 30, 1903 | 1 | | | | |
| Provost, I. E. | " October 9, 1902, to June 30, 1903 | | | 1 | | |
| Rouleau, J. C. | " July 8, 1902, to June 30, 1903 | 1 | | | | |
| Vasseur, S. H. | " February 4, 1903, to March 31, 1903 | 1 | | | | |
| Walker, J. H. | " July 16, 1902, to June 30, 1903 | 1 | | | | |
| Watson, James | " July 1, 1902, to July 31, 1902 | | | | | 1 |
| Wilmot, J. B. | " July 1, 1902, to March 31, 1903 | | 1 | | | |
| | Total | 18 | 7 | 3 | 2 | |

## APPENDIX B—*Concluded.*

## No. 9. LIST of Persons employed by the Inland Revenue Department on Salary, during the Year ended June 30, 1903—*Concluded.*

### RECAPITULATION.

| | |
|---|---|
| Employed during the year | 445 |
| " a portion of the year | 31 |
| Total | 476 |

### SERVICES

| | |
|---|---|
| Employed in the Inside Service | 26 |
| " Excise | 317 |
| " Weights and Measures | 67 |
| " Gas | 9 |
| " Electric Light Inspection | 5 |
| " Preventive Service | 5 |
| " Food Inspection | 6 |
| " Excise, Weights and Measures, Electric Light and Gas | 1 |
| " " and Gas | 11 |
| " " and Food Inspection | 8 |
| " Weights and Measures and Gas | 2 |
| " " " and Food Inspection | 1 |
| " Gas and Electric Light | 11 |
| " Excise, Gas and Electric Light | 3 |
| " Weights and Measures, Gas and Electric Light | 2 |
| " " " and Excise | 2 |
| Total corresponding with above | 476 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

# INDEX

|  |  | Page. |
|---|---|---|
| Acetic Acid | Duty accrued | 22 23 |
| " Return of Manufactures |  | 106 |
| " " " Comparative Statement for 1901 1902 and 1902 1903 |  | 106 |
| " Revenue |  | 6 8 |
| " " Comparative Statement showing monthly increase or decrease for 1901 1902 and 1902-1903 |  | 28-29 |
| " Warehouse Returns |  | 107 |
| " " " Comparative Statement for 1901 1902 and 1902 1903 |  | 108 |
| Adams J. S | Salary | 120 |
| Adulteration of Food, Expenditure, page 18 | Details of | 135 to 137 |
| " | Fees | 21 |
| " | Vote for | 64 |
| Ahearn, Thomas | Lessee | 110 |
| Ahearn & Soper | Electrical Supplies, &c | 150 |
| Alaska Pacific Express Co | Express charges | 128, 135 |
| Alexander, T. | Contingencies and salary | 117 |
| Allen, G. A | Duty-pay | 131 |
| " | Salary | 121 |
| Allen, S | Refunds | 47 |
| Alteman, P. J | Salary | 116 |
| Ambrose, T. H. | Refunds | 33 |
| American Bank Note Co | Contingencies | 128, 135, 148 |
| American Tobacco Co., The | Refunds | 36, 37, 39, 40, 41, 42, 43, 44, 45, 46 |
| Amor, William | Salary | 117 |
| Amount voted and expenditure authorized for each service |  | 64 |
| Amyot & Gauvin | Refunds | 32, 33 |
| Anderson, J. J. | Commission | 129, 130 |
| Anderson, T. E | " | 129, 130 |
| Anderton & Co. | Refunds | 32, 35 |
| Anderton, W. A | " | 32, 35 |
| Andrews, A. A. | Salary | 122 |
| Appendix, "A" | Statistics | 65 |
| " "B" | Details of expenditure | 116 |
| Archibald, L. C. | Lessee | 112 |
| Ateshian, Carnig | Refunds | 44, 45, 46 |
| Atkins, W | " | 36, 37 |
| Aubin, A | Contingencies | 149 |
| " | " and salary | 146 |
| Audette, L. A | Law stamps | 20 |
| Avery, W. & T | Contingencies | 144 |
| Baby, W. A. D | Duty-pay | 131 |
| " | Salary | 117 |
| Baikie, D. | " | 118 |
| Bailey, G. & Co | Contingencies | 128, 144 |
| Bailey, John | Purchaser | 114 |
| Baird & Tatlock | Contingencies | 136 |
| Baker, John S. | Salary | 142 |
| Baldwin, A. H | Lessee | 110 |
| Bank of British Columbia, The | " | 110 |
| Barber, J. S | Salary | 120 |
| Barnes, G | " | 125 |
| Barrett, J. K | Contingencies and salary | 127 |
| Barrie Gas District | " " | 145 |
| Barry, James | Salary | 142 |
| Basinet, L. | Contingencies and salary | 121 |
| Bauld, Bros. & Co | Refunds | 37, 38, 39, 43, 44, 46 |
| Bayard, G. A. | Duty-pay | 131 |
| " | Salary | 121 |
| Beauchesne, E. C. | Commission | 129, 130 |
| Beaulac, J. H. | Salary | 142 |
| Beaulieu, J. B | " | 123 |
| Beauport Brewing Co., Ltd | Refunds | 33 |
| Begy, L. A | " | 38, 45 |
| Behan, J. J | Salary | 141 |
| " | " and contingencies | 145 |
| Bélair, A. P | " | 122 |
| Bell, J. E | " | 116 |
| Bell, J. H | Contingencies and salary | 147, 150 |

| | | Page. |
|---|---|---|
| Bell Telephone Co., The | Messages | 139 |
| Belleperche, A. J. E | Salary | 121 |
| Belleville Electric Light District | Contingencies | 149 |
| " Excise Division | " and salaries | 116 |
| " Gas District | " " | 145 |
| " Weights and Measures Division | " " | 141 |
| Belyea, T. H. | Contingencies and salary | 124 |
| " | Distribution of seizures | 133 |
| Bénéteau, S | Salary | 121 |
| Benjamin, E. R. | Bill stamps | 19 |
| Bennett, James | Salary | 118 |
| Benoit, L. V | Contingencies and salary | 124, 136, 146 |
| " for Tourchot, A. L | Food analysis | 136 |
| Berlin Gas Office | Contingencies and salary | 145 |
| Bernard, N. J. D. | Duty-pay | 131 |
| " | Salary | 123 |
| Bernhardt, Peter | Refunds | 32 |
| Bernier, Hon. M. E | Salary | 138 |
| Bernier, J. A. | " | 142 |
| " | " | 123 |
| Berry, H. D | Refunds | 46 |
| Berry, H. L | Salary | 116 |
| Bickle, J. W | Contingencies and salary | 119, 145 |
| Billman, Chisholm & Co. | Refunds | 41 |
| Bill stamps—Distributors' Account | | 19 |
| Binney, J. W. | Commission | 129 |
| Bish, Philip | Duty-pay | 131 |
| " | Salary | 116 |
| Bishop, J. B | " | 117 |
| Bixel, A | Refunds | 31, 34 |
| Blackadar, Bros., Halifax | Subscription | 139 |
| Blackburn, R. *et al.* | Lessees | 110 |
| Blackman, C. | Salary | 117 |
| Blackwood, W | Refunds | 32, 35 |
| Blair, H. C | Commission | 129, 130 |
| Blair, J. B. | Salary | 120 |
| Blais, J. C. F | " | 123 |
| Blais, Narcisse | Lessee | 110 |
| Blaisdell, N. S | " | 110 |
| Blethen, C. W | Salary | 125 |
| Blumenstiel, I | Refunds | 37, 40, 43, 45, 47 |
| Blyth, A. | Salary | 118 |
| Bolduc, E | " | 142 |
| Bollard, A. | Refunds | 38, 41, 42, 45 |
| Bonded Manufactures, Revenue | | 6–8 |
| Bonded Warehouse License | | 47 |
| Boomer, J | Purchaser | 114 |
| Boomer, J. B. | Salary | 120 |
| Booth, J. R | Lessee | 110 |
| Boswell Bros. | Refunds | 32 |
| Bouchette, R. Errol. | Salary | 138 |
| Boudet, E | " | 142 |
| Bourassa, Joseph | " | 123 |
| Bourgault, Alp. | " | 138 |
| Bourget, O | " | 123 |
| Bourget, L. J. | " | 142 |
| Bousquet, J. O. | Duty-pay | 131 |
| " | Salary | 122 |
| Bouteiller, G. A | Duty-pay | 131 |
| " | Salary | 122 |
| Bowen, F. C. | " | 124 |
| Bowen, N. H. | Purchaser | 114 |
| Bowie, R | Refunds | 33 |
| Bowman, A. | Salary | 116 |
| Bowman, M | Food analysis | 136 |
| Boyd, A | Commission | 129 |
| Boyd, J. F. S. | Salary | 120 |
| Boyd, S. I. | " | 120 |
| Boyle, P. | " | 117 |
| Brabant, J. B. G. N | Distribution of seizures | 133 |
| " | Salary | 122 |
| Brain, Edwin | Refunds | 32, 35 |
| Brain, A. F. | Salary | 116 |
| Brandon Brewing Co., The | Refunds | 35 |
| Brantford Excise Division | Contingencies and salaries | 116 |
| Breen, J. | Salary | 141 |
| Brener, A. H | Refunds | 38, 41, 44 |

| | | Page. |
|---|---|---|
| Brennan, D. J. | Duty-pay | 131 |
| " | Salary | 117, 120 |
| Brennan, John | Duty-pay | 131 |
| " | Salary | 121 |
| Brentnall, F. F. | Distribution of seizures | 133 |
| " | Salary | 120 |
| Bridge, Revenue | Lessee | 15 |
| Bristol Ferry | " | 15 |
| British American Bank Note Co. | Contingencies | 128 |
| British Columbia Excise District | " and salary | 127 |
| Broadfoot, S. | " " | 116, 145 |
| Brockville Gas District | " | 145 |
| Brodeur, S. A. | Commission | 129, 130 |
| Bronson & Weston | Lessees | 110 |
| Bronson & Weston Lumber Co., The | " | 110 |
| Brook, Joseph | Tenant | 114 |
| Brown, H. A. | Refunds | 43 |
| Brown, W. J. | Salary | 116 |
| Bruneau, A. A. | Law costs | 144 |
| Bruyère, H. P. | Salary | 122 |
| Bryan, G. F. | Refunds | 37 |
| Bryson, Graham & Co. | Contingencies | 139 |
| Buckingham and Cumberland Ferry | Lessee | 15 |
| Buffalo and Point Abinot Ferry | " | 15 |
| Buildings | Revenue | 16 |
| *Bulletin des Recherches Historiques, Levis, P.Q.* | Subscription | 139 |
| Burgess, Thomas H. | Salary | 144 |
| Burke, T. | Contingencies and salary | 127 |
| Burns, John | Salary | 138 |
| Burns, R. J. | " | 120 |
| Butterworth & Co. | Contingencies | 128 |
| Buxton, Geo. | Refunds | 35 |
| Cahill, J. H. | Salary | 123 |
| Cahill, J. W. | Duty-pay | 131 |
| " | Salary | 121 |
| Calcutt, H. | Refunds | 31 |
| Calderon, A. M. | Salary | 128 |
| Calgary Excise Division | Contingencies and salaries | 125 |
| " Weights and Measures Division | " " | 143 |
| Cameron, A., McK. | Commission | 129, 130 |
| Cameron, D. M. | Duty-pay | 131 |
| " | Salary | 117 |
| Cameron, J. D. | Law Costs | 129 |
| Cameron, R. | " Stamps | 20 |
| Campbell, G. | Commission | 130 |
| Campbell, S. J. | Distribution of seizures | 133 |
| Campeau, F. R. E. | Salary | 138 |
| Canada Atlantic Ry. Co. | Freight | 144 |
| Canadian Express Co. | " | 128, 139, 144, 150 |
| *Canadian Gazette*, London, Eng. | Subscription | 139 |
| *Canadian Manufacturer*, Toronto, The | " | 139 |
| *Canadian Mining Review*, Ottawa | " | 139 |
| Canadian Pacific Railway Co. | Freight | 128, 144, 150 |
| " " | Lessee | 110 |
| " " Co's Telegraph | Messages | 139 |
| Canadian Rubber Co. | Contingencies | 128, 148 |
| Canadian Twist Tobacco | Quantity taken for consumption | 150 |
| Cape Breton, Weights and Measures Division | Contingencies and salary | 143 |
| Capital Brewing Co., The | Refunds | 33, 35 |
| Cargill, W. | Salary | 126 |
| Carling, T. H. | Refunds | 31, 33, 34 |
| Carpenter, S. H. | Distribution of seizures | 133 |
| Carroll, D. | Salary | 125 |
| Carroll, F. P. | " | 125 |
| Carson, H. | Contingencies | 139 |
| Carter, William | Salary | 138 |
| Casual Revenue | | 21 |
| Casey John | Salary | 118 |
| *Catholic Record*, The, London, Ont. | Subscription | 139 |
| *Catholic Register*, Toronto | " | 139 |
| Cauchon, Alp. | Commission | 129, 130 |
| Cauley, B. | Refunds | 37, 46 |
| Caven, A. | Contingencies and salary | 119 |
| Caven, W. | Distribution of seizures | 133 |
| " | Salary | 122 |
| Chabot, F. X. | " | 142 |

| | | Page. |
|---|---|---|
| Chagnon, C. P. | Salary | 123 |
| Chalus, J. O. | Contingencies and salary | 142 |
| Champness, F | Commission | 130 |
| Champness, S. S | " | 129 |
| Chandler & Massey | Contingencies | 136 |
| Charbonneau, Mrs. E | Salary | 138 |
| Charlottetown Electric Light District | Contingencies | 150 |
| " Excise Division | " and salaries | 125 |
| " Gas District | " and salary | 147 |
| " Weights and Measures Division | " and salaries | 143 |
| Chartier, E | Salary | 124 |
| *Chatham Daily News* | Subscription | 139 |
| Chemists and Surgeons Supply Co | Contingencies | 137 |
| Cheseldine, J. H | Salary | 117 |
| Chevalier, John | Purchaser | 114 |
| Chevrier, Miss B. | Contingencies | 138 |
| Chief Electrical Engineer | " and salary | 150 |
| Chief Inspector of Weights and Measures | " " | 143 |
| Chilver, F. W | Duty-paid | 131 |
| " | Salary | 121 |
| Chisholm, D. C | Law costs | 128 |
| Chisholm, J. J | Salary | 143 |
| Chisholm, W. N | " | 118 |
| Choat & Kern | Purchasers | 114 |
| Choquette, Revd. C. P | Contingencies | 137 |
| Cigarettes—Number taken for consumption | | 22-23 |
| Cigars—Comparative statement of manufactures for 1901-1902 and 1902-1903 | | 92-93 |
| " License fees | | 22-23 |
| " Licenses issued, materials used and number produced | | 90-91 |
| " Number taken for consumption | | 22-23 |
| " Refunds | | 46 |
| " Returns of manufactures | | 91 |
| " Revenue | | 6, 8 |
| " " Comparative monthly statement showing increase or decrease for 1901-1902 and 1902-1903 | | 28-29 |
| " Warehouse Return | | 94 |
| " " " Comparative statement for 1901-1902 and 1902-1903 | | 85 |
| *Citizen*, The, Ottawa | Subscription | 139 |
| City Police Court, Victoria | Contingencies | 128 |
| Clair Station and Kent Ferry | Lessee | 15 |
| Clark, A. F | Salary | 119 |
| Clark, A. J | Refunds | 47 |
| Clark, J. A | Salary | 124 |
| Clarke, E. C | Refunds | 32 |
| Clarke, L. H. | " | 31, 34, 35 |
| Clarke, T. H | " | 31 |
| Clarke, T | Salary | 118 |
| Cloutier, D | Refunds | 32 |
| Cobourg Gas District | Contingencies and salary | 145 |
| Codd, H. J. S | Salary | 122 |
| Code, A | " | 125 |
| Coleman, C | " | 120 |
| Coleman, J. J | Duty-pay | 131 |
| " | Salary | 123 |
| Coles, F. H | " | 117 |
| Collins, D | " | 142 |
| Commission on sales of Canada twist stamps | Detail of expenditure | 130 |
| " " " | Vote for | 64 |
| " to Customs officers | " | 64 |
| Comte, L. A. A. J | Distribution of seizures | 133 |
| " " | Salary | 122 |
| Conklin, W. M | " | 125, 135 |
| " | Travelling expenses | 136 |
| Conroy, Mary | Lessee | 110 |
| Contingencies—Adulteration of Food | | 135 to 137 |
| " Departmental | | 138 to 140 |
| " Electric Light, General | | 150 |
| " Excise, General | | 128 |
| " Gas, General | | 148 |
| " Minor revenues | | 135 |
| " Weights and Measures, General | | 144 |
| Controller of Stationery | Books | 139 |
| " | Parliamentary publications | 139 |
| " | Stationery | 139 |

| | | Page. |
|---|---|---|
| Cook, W. R | Salary | 120 |
| Corby, H. | Refunds | 34 |
| Cornwall Gas District | Contingencies and salaries | 116 |
| " Excise Division | " " | 145 |
| Corporation of the Town of Thorold, The | Refunds | 47 |
| " Quebec | Lessee | 110 |
| " Three Rivers | " | 110 |
| Cosgrove, L. J | Refunds | 32, 35 |
| Costello, J. W | Salary | 143 |
| Costigan, J. J | " | 122, 135 |
| " | Travelling expenses, &c | 136 |
| Coughlin, D | Salary | 141 |
| Coulter, A | " | 120 |
| Courtney, J. J | " | 122 |
| Coutlee, L. M | Lessee | 110 |
| Coutts, J. J | Salary | 116 |
| Cowan, E | " | 142 |
| Cram, J. W | " | 118 |
| Crawford, W. P | " | 117 |
| Creed, J. N. & Co | Refunds | 41, 43, 44, 46 |
| Creely, George | Purchaser | 114 |
| Cross, A. E | Refunds | 33 |
| Cross Point and Campbellton Ferry | Lessee | 15 |
| Crotty, John | Duty-pay | 131 |
| " | Salary | 121 |
| Crowe, W | " | 121 |
| *Cultivateur, Le*, Montreal | Subscription | 139 |
| Curless, C | Distribution of seizures | 133 |
| Curren, A. E | Refunds | 32, 33, 34, 35 |
| Currier, J. M | Lessee | 110 |
| Dager, H. J | Salary | 120 |
| Daignault, G | " | 124 |
| *Daily Chronicle*, Halifax, N.S | Subscription | 139 |
| *Daily Star*, Toronto | " | 139 |
| *Daily Telegraph*, The, Quebec | " | 139 |
| *Daily Telegraph*, St. John, N.B | " | 139 |
| *Daily Witness*, Montreal | " | 139 |
| Daly, J. M | Refunds | 38, 45, 46 |
| Daoust, J. A | Salary | 142 |
| Daveluy, J. P | " | 122 |
| David, T | " | 122 |
| Davis, J | " | 117 |
| Davis, S. & Sons | Refunds | 37, 41, 43 |
| Davis, T. G | Salary | 117 |
| Davy, E | " | 143 |
| Dawes, A. J | Refunds | 32, 34 |
| Dawson, D | Commission | 130 |
| Dawson, E. J | Refunds | 36, 38 |
| Dawson, W | Duty-pay | 131 |
| " | Salary | 116 |
| De Cazen, C | Refunds | 39, 40, 41, 42, 43, 44, 45, 46 |
| Deland, A. N | Salary | 124 |
| Dennis, W. A | " | 145 |
| Departmental Contingencies | Vote for | 64 |
| Departmental Expenditure, page 48 | Details of | 138 to 140 |
| Department Contingencies | Vote for | 64 |
| " Salaries | " | 64 |
| Desaulniers, J. E | Duty-pay | 131 |
| " | Salary | 122 |
| Desjardins, Alfred | Lessee | 110 |
| Dessert, V | Salary | 142 |
| Devlin, F | Refunds | 31, 35 |
| Dewar, Colin | Lessee | 110 |
| Dibblee, William | Salary | 124 |
| Dick, J. W | " | 120 |
| Dick, Walter | Duty-pay | 131 |
| Dickson, C. T | Contingencies and salary | 117 |
| Dingman, N. J | " " | 127 |
| Distribution of seizures | | 133-134 |
| " recapitulation of | | 134 |
| District Inspectors—Excise | " " | 127 |
| " Gas | " " | 145 to 147 |
| " Weights and Measures | " " | 141 to 143 |
| Dixon, H. G. S | Salary | 122 |
| Dodd, William | Lessee | 110 |
| Dominion Express Co | Freight | 128, 135, 139, 144, 150 |
| Dominion Phosphate Co., Ltd | Lessee | 112 |

| | | PAGE. |
|---|---|---|
| Donaghy, W. | Salary | 117 |
| Donald, J. T. | Food analysis | 136 |
| Donoghue and Bradley | Refunds | 40 |
| Donnely, J. | " | 38 |
| Dooley, James | " | 43, 45 |
| Douglass, H. | Commission | 130 |
| Douglass, H. M. | Refunds | 38, 45 |
| Doyle, B. J. | Duty-pay | 131 |
| " | Salary | 120 |
| Doyle, Miss E. T | Extra services | 139 |
| Doyon, J. A | Salary | 138 |
| Dow, W. & Co. | Refunds | 32 |
| Downer, J. R. | " | 33 |
| Drewry, E. C. | " | 32 |
| Drewry, E. L. | " | 35 |
| Dubuc, A. J | Contingencies | 136 |
| Dudley, W. H | Salary | 120 |
| Dufresne, J. U. | Contingencies and salary | 149 |
| Dumaine, J. D. E. | Salary | 124 |
| Dumbrille, R. W. | " | 117 |
| Dumouchel, L. | " | 122 |
| Dundas and Waterloo Road Lessee | Minor expenditure | 15 |
| Dunlop, C | Salary | 121 |
| Dunne, J. P. | " | 138 |
| Dunnville Bridge | Lessee | 15 |
| Duplessis, C. Z. | Salary | 124 |
| Dupont, J. C. | Contingencies | 140 |
| Dustan, W. M. | " and salary | 143 |
| Duty-pay to officers | Details of expenditure | 131 |
| " " | Vote for | 64 |
| " other than special surveys | " | 64 |
| Dwyer, D. T. | Salary | 124 |
| Dyer, J. J | Refunds | 40, 43 |
| Eastern Township Bank | " | 30, 31 |
| Eaton, C. | " | 31, 35 |
| Edmunston and Maine Ferry | Lessee | 15 |
| Edwards, E. B | Contingencies | 144 |
| Edwards, W. C. & Co., Ltd. | " | 128, 144 |
| Egan, W | Salary | 118 |
| *Eganville Leader*, The | Advertising | 135 |
| Egener, A. | Salary | 119 |
| Eimer and Amend | Contingencies | 128, 136 |
| Ein, S | Refunds | 36, 37, 39, 40. 41, 42, 43, 44, 45, 46 |
| Electric Light Inspection Contingencies | Vote for | 64 |
| " " Expenditure, page 61 | Details of | 149-150 |
| " " Registration Fees | Refunds | 47 |
| " " Revenue | | 23 |
| " " Revenue | Monthly deposits | 24 to 27 |
| " " | Districts in account with revenue | 60 |
| " " | Stamps revenue | 49 |
| Elliott, T. H | Salaries | 120, 141 |
| Ellis, W. H. | Food analysis | 136 |
| Errett, R. W. | Salary | 141 |
| Estate of late Robert Reid | Purchaser | 114 |
| Evans, G. T. | Salary | 120 |
| *Evening Journal*, Ottawa | Subscription | 139 |
| Excise Contingencies | Vote for | 64 |
| " " on account of stamps | " | 64 |
| " Expenditure, pages 10 to 13 | Details of | 116 to 132 |
| " " on account of stamps | Vote for | 64 |
| " General expenditure, pages 10-13 | Details of | 4-5 |
| " Revenue | | 6 to 9 |
| " " Comparative Statement showing increase or decrease for 1901 1902 and 1902 1903 | | 28-29 |
| " " | Monthly deposits | 24 to 27 |
| " Salaries | Vote for | 64 |
| " Statistics | | 65 |
| Expenditure—Adulteration of food, page 18 | Details of | 135 to 137 |
| " Departmental, page 48 | " | 138 to 140 |
| " Details of (Appendix B) | | 116 to 159 |
| " Electric light inspection, page 61 | " | 149-150 |
| " Excise, pages 10 to 13 | " | 116 to 132 |
| " Gas inspection, pages 58 to 59 | " | 143 to 147 |
| " General statement | | 4-5 |
| " Sundry minor, page 21 | " | 135 to 137 |
| " Weights and Measures, pages 49 to 55 | " | 141 to 144 |
| Fagan, J. C. | Food analysis | 136 |

| | | Page. |
|---|---|---|
| Fahey, Edward | Salary | 117 |
| Fair, T. J. | Refunds | 36, 40, 45, 46 |
| Fair, T. J. & Co., Ltd | " | 43 |
| Falconer, J. E | Duty-pay | 131 |
| " | Salary | 121 |
| Falconer, R. H | " | 120 |
| *Farmers Advocate*, The | Subscription | 139 |
| Farquharson & Grainger | Refunds | 31, 35 |
| Feetzel, Jas. O (read Teetzel, Jas. V) | Law costs | 129 |
| Ferguson, J | Salary | 119 |
| Ferguson, J. C | " | 124, 135 |
| " | Travelling and other expenses | 136 |
| " J. M | Contingencies | 137 |
| Ferries—Revenues | Fees | 15 |
| Fertilizers | Inspection fees | 21 |
| Findlay, R | Salary | 141 |
| Findley, H | Contingencies and salary | 143 |
| Finlayson, Roderick | Lessee | 110 |
| Finn, Louis | Refunds | 36, 37, 39, 40, 41, 42, 43, 44 |
| Fiset, M | Food analysis | 136 |
| Fisher, John | Refunds | 31, 34 |
| Fitzgerald, E. W | Salary | 141 |
| Fitzpatrick, J | " | 124 |
| Fletcher, R. W | " | 125, 135 |
| " | Travelling Expenses | 136 |
| Flynn, D. J | Salary | 120 |
| Fontaine, A | Contingencies and salary | 149, 150 |
| Food, Adulteration of—Expenditure, page 18 | Details of | 135 to 137 |
| " " | Vote for | 64 |
| Food Inspection | General statement of expenditure | 18 |
| Forest, E | Contingencies | 128 |
| " | Vote for | 64 |
| Forest, E. R | Salary | 122 |
| Forest, M | " | 121 |
| Forest, Z | Commission on sale of tobacco stamps | 130 |
| Fort Erie and Buffalo Ferry | Lessee | 15 |
| Fort Steele Brewing Co | Refunds | 33 |
| Fortier, J. J. O | Salary | 124 |
| Fortier, J. M | Refunds | 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46 |
| Fortier, V | Salary | 122 |
| Foster, Henry | " | 117 |
| Fournier, E | Contingencies | 144 |
| Fournier, L. A | Salary | 142 |
| Fowler, G | " | 138 |
| Fowler, J. D | " | 147 |
| Fox, J. D | " | 122 |
| Fox, Thomas | " | 122 |
| Frame, A | Contingencies and salary | 143 |
| Francis, Albert | " | 144 |
| Frankland, H. R | Distribution of seizures | 133 |
| " | Contingencies and salary | 120 |
| Fraser, James | Refunds | 36 |
| Fraser, P | Contingencies and salary | 125 |
| " | Distribution of seizures | 133 |
| Fréchette, L. A | Translation, vote for | 64 |
| " | " | 128 |
| Fredericton Gas District | Salary | 147 |
| Freed, A. T | Contingencies and salary | 141 |
| Freeland, A | " " | 118 |
| *Free Press*, Ottawa | Subscription | 139 |
| Furguson, D | Commission | 129, 130 |
| Fusel Oil | Refunds | 47 |
| Fyfe, Jas | Contingencies | 147 |
| " | Salary | 143 |
| Gamache, J. N | " | 121 |
| Garbatz, John | Purchaser | 114 |
| Gardner, H. B | Refunds | 36 |
| Gas Inspection—Contingencies | Vote for | 64 |
| " Expenditure, pages 58-59 | Details of | 143 to 147 |
| " | Inspection districts in account with revenue | 56-57 |
| " Revenue | Monthly deposits | 24 to 27 |
| " Salaries | Vote for | 64 |
| " Stamps | Distributor's account | 58-59 |
| " " | Stamps revenue | 49 |
| Gass, Charles S | Lessee | 115 |
| Gauvin, E | Salary | 123 |
| *Gazette* The Montreal | Subscription | 139 |

| | | Page. |
|---|---|---|
| George, J | Salary | 118 |
| Geldart, O. A | " | 124 |
| General Electric Light Contingencies | | 150 |
| General Excise—Contingencies | | 128 |
| General Gas Contingencies | | 148 |
| General Weights and Measures Contingencies | | 144 |
| G. E. Tuckett & Son Co., Ltd., The | Refunds | 36, 37. 38, 39, 40, 41, 42, 44, 44, 45 |
| George, John | Salary | 118 |
| Gerald, Charles | Duty-pay | 131 |
| " | Salary | 120 |
| Gerald, W. H | Contingencies | 128 |
| " | Duty-pay | 131 |
| " | Salary | 119 |
| Gerald, W. J | Salaries | 138 |
| " | Travelling expenses | 139 |
| Gerow, W. M | Salary | 125 |
| Gervais, S | " | 142 |
| Gilhuly, R. H | Commission | 129 |
| Gill, William | Contingencies and salary | 127 |
| Gilpin, R. R | Commission | 129, 130 |
| Girard, I | Salary | 117 |
| Girdlestone, R. J. M | " | 125, 143 |
| Girdwood, S. P | Contingencies | 137 |
| *Globe* Printing Co., Toronto | Subscription | 139 |
| Goldie McCullough & Co., Ltd | Refunds | 47 |
| Gooderham, W. J | " | 32, 35 |
| Gooderham & Worts | Contingencies | 136 |
| Goodman, A. W | Duty-pay | 131 |
| " | Salary | 118 |
| Gordon, D. W | Lessee | 110 |
| Gorham & Co. J. W | Refunds | 38 |
| Gorman, A. M. | Salary | 125 |
| Gosnell, T. S | Contingencies and salary | 125 |
| Gouin, Lomer | Law costs | 128 |
| Gowrie & Blackhouse Collieries, Ltd., The | Lessee | 112 |
| Government Telegraph Lines | " | 15 |
| Gow, J. E | Duty-pay | 131 |
| " | Salary | 121 |
| Gowen, E. N | Refunds | 33 |
| Gowen, E. W | " | 33 |
| Graham, A. L | Salary | 120 |
| Graham, W. J | Contingencies and salary | 118, 146, 149 |
| Graham, W. T | Duty-pay | 131 |
| " | Salary | 120 |
| Grand Trunk Ry. Co | Lessee | 112 |
| Granda, F | Refunds | 41 |
| Grant, H. H | Contingencies and salary | 125 |
| " | Distribution of seizures | 133 |
| Grant's Spring Brewing Co., Ltd | Refunds | 32, 35 |
| Gravel, A. I | Contingencies and salary | 143 |
| Graves Bros | " " | 128, 144 |
| Great Northern Transit Co | Lessee | 110 |
| Great North-western Telegraph Co | Telegrams | 139 |
| Green, Fischel & Co | Refunds | 36 |
| Grier, G. A., & Co | Lessees | 110 |
| Grignon, A | Commission on sale of tobacco stamps | 124 |
| Grimason, Thomas | Salary | 117 |
| Grosbois, C. B. de | " | 124 |
| Grothé, L. O | Refunds | 36, 38 |
| Guay, A | Gratuity | 144 |
| " | Salary | 142 |
| " | Vote for | 64 |
| Guay, G. N | Contingencies and salary | 142 |
| Guelph, Excise Division | " " | 116 |
| " Gas District | " " | 145 |
| Hagarty, Miss B | Salary | 138 |
| Hagarty, P | " | 126 |
| Halifax Electric Light District | Contingencies | 149 |
| " Excise Division | " and salaries | 125 |
| " Gas District | " " | 147 |
| " Weights and Measures Division | " " | 143 |
| Halliday, W. A | Salary | 138 |
| Halloran, M. K | Refunds | 43 |
| Hamilton Electric Light Inspection District | Contingencies | 149 |
| " Excise Division | " and salaries | 117 |
| " Gas District | " " | 145 |
| " Weights and Measures Division | " " | 141 |

| | | Page. |
|---|---|---|
| Hamilton, J. S. & Co | Refunds | 30 |
| Hanley, A. | Salary | 117 |
| Harkness, Thos | Refund | 38, 45 |
| Harris, J. G. | Salary | 119 |
| Harris, Bronson & Co | Lessees | 110 |
| Harrison, F. T. | Food analysis | 136 |
| Harrison, W. F. | Salary | 124 |
| Hart, P. D | " | 116 |
| Harwood, J. O. A. | " | 122 |
| Haszard, F. S. | Contingencies | 150 |
| Havez, Vve L. | " | 144 |
| Hawkesbury and Grenville Ferry | Lessee | 15 |
| Hawkins, A. C. | Salary | 116, 120, 123 |
| Hawkins, W. L. | " | 125 |
| Hayhurst, T. H | " | 117 |
| Hayward, W. J | Contingencies and salary | 141 |
| Hébert, C. D | " | 124 |
| Hébert, J. A. P. | Salary | 142 |
| Heffler, Capt. E. | Distribution of seizures | 133 |
| Helliwell, H. N | Salary | 120 |
| Heisz, L. | Refunds | 31, 35 |
| Henderson, H | " | 33 |
| Henderson, W | Salary | 120 |
| Heney, J. J. | Refunds | 30, 31 |
| Henry, J | " | 36. 37, 38, 39, 40, 41, 42, 43, 44, 45, 46 |
| Henwood, G | Distribution of seizures | 134 |
| " | Salary | 126 |
| Hesson, C. A | Contingencies and salary | 119 |
| " | Distribution of seizures | 133 |
| Heuser P | Refunds | 34 |
| Heuther, W | " | 35 |
| Hicks, W. H. | Contingencies and salary | 146 |
| " | Salary | 117 |
| Higman, O | Contingencies and salary | 150 |
| Hill, John | Refunds | 40 |
| Himsworth, W. | Salary | 138 |
| Hinchey, E. H. | " | 118 |
| Hiram Walker & Sons Ltd | Refunds | 30, 33, 35 |
| Hirsch, Jacob | " | 39 |
| Hobbs, G. N | Salary | 117 |
| Hobrecker, A | Refunds | 37, 39, 41, 42, 43, 44 |
| Hodder, W. E | Salary | 126 |
| Holden, Daniel | Purchaser | 114 |
| Holiday, Thos. | Refunds | 32, 33, 35 |
| Houde, B. & Co. | " | 36, 37, 39, 40, 41, 43, 44 |
| Howard, W. W. S. | Duty-pay | 131 |
| " " | Salary | 120 |
| Howden, R | " | 119 |
| Howell, Thomas | " | 126 |
| Howie, A | Duty-pay | 131 |
| " | Salary | 116 |
| Hubley, H. H | " | 125 |
| Hudon, L. E | " | 138 |
| Hudson, W | Lessee | 110 |
| Hudson Bay Co. | Refunds | 43 |
| Huether, C. N | " | 32 |
| Huether, W | " | 31 |
| Huff, G. H | Lessee | 110 |
| Hughes, Henry | Salary | 143 |
| Hughes, P. A | " | 138 |
| Hughes, R. A. | " | 141 |
| Hull Brewing and M | Refund | 33, 35 |
| Hull Ferry (old) | Lessee | 15 |
| Hurst, Levi B | Duty pay | 131 |
| " | Salary | 120 |
| Hydraulic and other rents | Appendix "A" | 110 to 115 |
| " " | Lessee's account | 110 to 115 |
| " " | Monthly deposits | 24 to 27 |
| " " | Refunds | 47 |
| " " | Revenue | 14 |
| Hynes, Jos. | Refunds | 41 |
| Iler, B | Contingencies and salary | 116 |
| Imperial Brew. Co | Refunds | 33 |
| Inland Revenue Department | List of persons employed in | 151 to 160 |
| " " Expenditure, page 48 | Details of | 138 to 140 |
| Inspector of distilleries | Contingencies | 127 |
| Inspectors of bonded factories | " | 127 |

| | | Page. |
|---|---|---|
| Inspectors, Excise Districts | Contingencies and salaries | 127 |
| *Intelligencer*, Belleville | Subscription | 139 |
| Irion, A. L | Refunds | 33, 35 |
| Ironside, G. A | Contingencies and salary | 119 |
| Irwin, R | Salary | 117 |
| " | Duty-pay | 131 |
| Irwin, S | Salary | 141 |
| Isaacs, A | Refunds | 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46 |
| Jacobs, H. & Co | " | 39, 46 |
| Jacobs & Co. J | " | 44 |
| James, T. C | Salary | 125 |
| Jameson, S. B | " | 125 |
| Jamieson, R. C. | Duty-pay | 131 |
| " | Salary | 120 |
| Jarvis, Henry | " | 141 |
| Johnson, J. J | Duty-pay | 131 |
| " | Salary | 118 |
| Johnson, W | Contingencies and salaries | 141, 145, 149 |
| Johnston, C. W | Salary | 145 |
| Johnston, W | Contingencies | 146 |
| Johnston, G. E | Duty-pay | 131 |
| " | Salary | 119 |
| Johnstone, J. K | Contingencies | 149 |
| " | " and salary | 146 |
| Joliette Excise Division | " and salaries | 121 |
| Joncas, P. L | Commission | 130 |
| Jones, Andrew | Duty-pay | 131 |
| " | Salary | 120 |
| Jones, R | Contingencies | 128 |
| " | " and salaries | 126, 147 |
| " | Distribution of seizures | 134 |
| Jones, Siméon, Ltd | Refunds | 33 |
| Jones, Yarnell & Poulter, London | Subscription | 139 |
| Jubenville, J. P | Salary | 121 |
| Kavanagh, A. J | Commission | 129, 130 |
| Kearney, D. J | Distribution of seizures | 133 |
| " | Salary | 122 |
| Keay, W. S | Commission | 129, 130 |
| Keeler, G. S | Duty-pay | 131 |
| " | Salary | 119 |
| Keilty, Thomas | " | 119 |
| Kelly, D | " | 141 |
| Kelly, G | Refunds | 38, 44 |
| Kelly, Jos | " | 41 |
| Kelly, M. J | Gratuity | 144 |
| " | Salary | 142 |
| " | Vote for | 64 |
| Kenning, J. H | Contingencies and salary | 127 |
| Kenny, J | Commission | 129, 130 |
| Kenrick, E. B | Food analysis | 136 |
| Keogh, P. M | Duty-pay | 131 |
| " | Salary | 121 |
| Keuffel Esser Co | Contingencies | 150 |
| Kidd, Thomas | Salary | 135 |
| " | Travelling expenses | 136 |
| Kilroy, E. F | Duty-pay | 131 |
| " | Salary | 116 |
| Kimberley, G. F | Refunds | 41 |
| King, H. L | " | 30, 31 |
| King, R | " | 31 |
| King, R. M. | Salary | 125 |
| King's Printer | Lithographing | 139 |
| " | Printing | 139 |
| Kingston Excise Division | Contingencies and salaries | 117 |
| Kingston Gas District | " and salary | 145 |
| Kirk, J. T | Commission | 129, 130 |
| Knowles, Charles | Salary | 142 |
| Kressler, J. H | Refunds | 37 |
| Kuntz, Jacob | " | 31, 35 |
| Labatt, John | " | 31, 33, 34 |
| Labelle, L | Commission on tobacco stamps | 124 |
| Labelle, L. V | Salary | 121 |
| Ladouceur, J | Extra services | 144 |
| Laidman, R. H | Salary | 141 |
| Lambert, J. A | " | 122 |
| Lamoureux, T. A. | " | 123 |
| Land sales | Details | 114-115 |

| | | PAGE. |
|---|---|---|
| Land sales | General account of | 14 |
| Lane, T. M | Salary | 122 |
| Langley & Martin | Law costs | 128, 135 |
| Lapasse and Gower Point Ferry | Lessee | 15 |
| *La Patrie*, Montreal | Subscription | 139 |
| Lapierre, T | Commission on tobacco stamps | 124 |
| Laporte, G | Salary | 118, 123 |
| *La Presse*, Montreal | Subscription | 139 |
| LaRivière, A. C | Salary | 125 |
| LaRue, A | " | 123 |
| LaRue, A. P | " | 123 |
| LaRue, G | Contingencies and salary | 123 |
| LaSalle, B | Bill stamps | 19 |
| *La Tribune*, St. Hyacinthe | Subscription | 139 |
| Latrimouille, C | Contingencies | 139 |
| Laurentides Pulp Co., Ltd | Lessee | 112 |
| " " | Refunds | 47 |
| Laurier, J. L | Distribution of seizures | 133 |
| " | Salary | 122 |
| Laverdure, E. G | Lessee | 110 |
| Lavoie, J. M | Refunds | 43 |
| Lawrence, G. C. | Salary | 143 |
| Law Costs | Expenditure | 123 |
| Lawless, Miss E. M | Salary | 138 |
| Lawlor, H | Contingencies and salaries | 122, 127 |
| " | Distribution of seizures | 133 |
| Lawlor, J. J | Salary | 117 |
| Law stamps | Distributor's account | 20 |
| " revenue | | 49 |
| Lebel, J. A. W | Salary | 142 |
| *Le Cultivateur*, Montreal | Subscription | 139 |
| Lee, E | Salary | 117 |
| Lee, Edward | " | 117 |
| Lee, Thomas | Refunds | 39, 44 |
| Lemesurier, J | " | 40, 43, 46 |
| Lemoine, Alp | Salary | 137 |
| Lemoine, J | " | 123 |
| Lépine, L | " | 123 |
| *Le Progrès de l'Est* | Advertising | 135 |
| *Le Soleil*, Quebec | Subscription | 139 |
| *Le Temps*, Ottawa | " | 139 |
| *L'Evangeline*, Weymouth, N. S. | " | 139 |
| LeVasseur, N. | Contingencies | 149 |
| " | " and salary | 146 |
| Levêque, H | Salary | 135 |
| Levett, G | Refunds | 36, 42 |
| Lewis, Frank | " | 45 |
| Licenses, Excise | Revenue from | 22-23 |
| Lion Brew. Co | Refunds | 33 |
| List of persons employed by Inland Revenue Department | | 151 to 160 |
| Listowel Gas District | Contingencies and salary | 145 |
| Lithgow, J. T. | Law stamps | 20 |
| Logan, J | Salary | 117 |
| London Electric Light District | Contingencies | 149 |
| " Excise Division | " and salaries | 117, 118 |
| " Gas District | " and salary | 145 |
| Long, W. H | Salary | 125 |
| Lownsborough, W | Commission | 129 |
| Lowther, C | " | 129 |
| Luke, C | Refunds | 31, 34 |
| Lyman Sons & Co. | Contingencies | 128, 136, 150 |
| Lyons, Edward | Salary | 117 |
| Macdonald, A. B | " | 119 |
| Macdonald, Sir W. C. | Refunds | 36, 39, 41, 43 |
| Macdonald, A. J | Salary | 125 |
| Macdonald, D | " | 128 |
| Macdonald, J. A | Contingencies and salary | 141 |
| Mace, T. F | Refunds | 32 |
| Macfarlane, Thomas | Salary | 135 |
| " " | Travelling and other expenses | 136 |
| Macintyre, D | Salary | 122 |
| MacKenzie, J. H | Distribution of seizures | 133 |
| " | Salary | 120 |
| Macpherson, W. J | Commission | 129, 130 |
| Mager, J. G | Salary | 143 |
| Magness, Robert | Contingencies and salaries | 143, 147 |
| Mahoney, H | Salary | 120 |

| | | Page. |
|---|---|---|
| Mahoney, M. | Distribution of seizures | 133 |
| Mainville, C. P. | Salary | 122 |
| *Mail and Empire*, Toronto | Subscription | 139 |
| Male, Thomas | Contingencies and salary | 145 |
| Mallish, H | Law cost | 129 |
| Malo, T | Duty-pay | 131 |
| " | Salary | 122 |
| Malt—Comparative Statement for 1901-1902 and 1902-1903 | | 78-79 |
| " License fees | | 22-23 |
| " Licenses issued, grain used, quantity produced | | 74-75 |
| " Quantity taken for consumption | | 22-23 |
| " Revenue | | 6, 8 |
| " " Comparative Statement showing monthly increase or decrease for 1901-1902 and for 1902-1903 | | 28-29 |
| " " Refunds | | 31 to 35 |
| " " Warehouse returns | | 76-77 |
| " " " Comparative Statement showing increase or decrease for 1901-1902 and for 1902-1903 | | 78-79 |
| Malt Liquor, Comparative Statement showing monthly increase or decrease for 1901-1902 and 1902-1903 | | 28-29 |
| " " License fees for 1902-1903 | | 22-23 |
| " " Licenses issued, materials used and quantity produced | | 80-81 |
| " " Quantity taken for consumption | | 22-23 |
| " " Revenue | | 6, 8 |
| " " " Comparative Statement of malt liquor manufactured for the years 1901-1902 and 1902-1903 | | 81 |
| " " Refunds | | 35 |
| Manitoba Excise District | Contingencies and salary | 127 |
| Manitoba *Free Press* | Subscription | 139 |
| Manness, S. R | Refunds | 38 |
| Manufactures in Bond.—Comparative Statement for 1901-1902 and for 1902-1903 | | 100-101 |
| " License fees | | 22-23 |
| " Licenses issued, materials used and quantity produced | | 98-99 |
| " Quantity taken for consumption | | 22-23 |
| " Revenue | | 6, 8 |
| " " Comparative Statement showing monthly increase or decrease for 1901-1902 and for 1902-1903 | | 28-29 |
| " " Refunds | | 46 |
| " " Warehouse returns | | 102-103 |
| " " " Comparative Statement showing increase or decrease for 1901-1902 and 1902-1903 | | 104-105 |
| Maranda, N. A. | Salary | 122 |
| Marcon, F. E | Duty-pay | 131 |
| " | Salary | 121 |
| Marentette A | " | 141 |
| Marin, L. H | " | 123 |
| Marion, H. R | " | 121 |
| Marsh, R. J. F | Commission | 129, 130 |
| Marshall, I. N | Salary | 119 |
| Mason, F | Duty-pay | 131 |
| " | Salary | 118 |
| Mauray, Jonathan | Lessee | 110 |
| Maurice, E | Salary | 118 |
| Maveity, Mrs. S | Contingencies | 140 |
| May, G & Son | " | 150 |
| May, J. P | Refunds | 33 |
| May, L. A | " | 33, 35 |
| Metcalf, W. F. | Salary | 120 |
| Methylated Spirits | Monthly deposits | 24 to 27 |
| | Refunds | 47 |
| " Statement showing expenditures, pages 62-63, Vote for | | 64 |
| " " net receipts | | 62-63 |
| " " quantity of raw material on hand at beginning and end of year 1902-1903, brought in and used during year 1902-1903 | | 109 |
| " " quantity of raw material used and quantity produced therefrom | | 109 |
| Methylated Spirits—Statement showing quantity of methylated spirits on hand at beginning and end of year, brought in and sold and otherwise accounted for, during the year 1902-1903 | | 109 |
| " " transactions in connection with manufacture of | | 62-63 |
| Metric System supplies | Vote for | 64 |
| Michon, A. E | Salary | 123 |
| Millard, H. R | Contingencies | 144 |
| Miller, A. | " | 149 |
| " | " and salary | 147 |
| Miller, J. E | " " | 126, 147 |

| | | Page. |
|---|---|---|
| Miller, J. E. | Distribution of seizures | 134 |
| Miller, W. F. | Contingencies and salary | 117 |
| " | Distribution of seizures | 133 |
| Miller & Lockwell | Refunds | 40 |
| Millier, E. | Duty-pay | 131 |
| " | Salary | 122 |
| Milligan G. | Refunds | 36, 38, 40, 42. 43. 45 |
| Milligan, R. J | Salary | 141 |
| Milliken, E. | " | 119 |
| Mills, A. K. & Son | Contingencies | 150 |
| Minister of Inland Revenue. | Salary, vote for | 64 |
| Minor Expenditure, page 18. | Details of | 135 to 137 |
| " Revenues | Vote for | 64 |
| Minor Public Works | Revenue | 15-16 |
| " Revenue | Monthly deposits | 24 to 27 |
| Montebello and Alfred Ferry | Lessee | 15 |
| Montreal, B. Co | Refunds | 32 |
| Montreal Electric Light Inspection District | Contingencies | 149 |
| " Excise Division | " and salary | 122-123 |
| " " | Distribution of seizures | 133 |
| " Gas District | Contingencies and salaries | 146 |
| " Weights and Measures | " " | 142 |
| Moore, T | Salaries | 125, 135 |
| " | Travelling expenses | 136 |
| Moreau, Aug. | Duty-pay | 131 |
| " | Salary | 121 |
| Moreau, A. | Salaries | 142, 146 |
| Morin, J. P | Salary | 142 |
| Mulhern, M. M | Contingencies and salaries | 116. 145 |
| Mulrooney, G. | Duty-pay | 131 |
| Munro, H. D | Salaries | 125, 147 |
| Murdoch, J. | Salary | 141 |
| Murphy, J. L | " | 118 |
| Murphy, M. | Purchaser | 114 |
| Murray, A. E | Salary | 120 |
| Murray, D. | Distribution of seizures | 134 |
| " | Duty-pay | 131 |
| " | Salary | 124 |
| McAdam, Thomas | Purchaser | 114 |
| McAloney, J. A | Salaries | 126, 143, 147 |
| McArthur, G. A | Duty-pay | 131 |
| McArthur, G. H | Salary | 121 |
| McCarthy, D. J. | Refunds | 33, 34 |
| McCloskey, J. R. | Salary | 124 |
| McCoy, William | Duty-pay | 131 |
| " | Salary | 116 |
| McCraney, H. P. | " | 126 |
| McCuaig, A. F | " | 116 |
| McCullough, A. | " | 138 |
| McCutcheon, H. M | " | 126 |
| McDermot, A. L. | Commission | 129, 130 |
| McDonald, A. B | Duty-pay | 131 |
| McDonald, J. | Salary | 141 |
| McDonald, A. R | Distribution of seizures | 134 |
| McDonald, A. W | Salary | 143 |
| McDonald, J. F. | Commission | 129 |
| McDonald, R. D. | Refunds | 38, 41, 44 |
| McDonald, Rt. Revd. Bishop | Lessee | 112 |
| McFarland, C. D. | Salary | 117 |
| McFarlane, J. | " | 141 |
| McFee, A. C | Duty-pay | 131 |
| " | Salary | 116 |
| McGill, A | " | 135 |
| McGowan, G. A | Refunds | 42 |
| McGuire, T. J | Commission | 129, 130 |
| McGuire, T. | Salary | 118 |
| McHugh, J. | Refunds | 41 |
| McIntyre, Rt. Rev. Bishop | Lessee | 112 |
| McKay Milling Co. Ltd | " | 110 |
| McKenna, A | Refunds | 36, 39, 40. 42. 43, 44. 45. 46 |
| McKenzie, W. | Commission | 129 |
| McLaughlin, G. | Contingencies | 128 |
| McLenaghan, N | " and salary | 118 |
| McLeod, Col. J. F | Bill stamps account | 19 |
| McNee, Archie. | Lessee | 112 |
| McNee, J | Refunds | 38. 41. 44 |
| McNiven, J. D | Salary | 125 |

| | | Page. |
|---|---|---|
| McPherson, M. J | Commission | 130 |
| McPhie, D | Contingencies | 147, 149 |
| " | " and salary | 145 |
| McPhie, W. H | Salary | 145 |
| McSween, James | " | 121 |
| Nanaimo Gas District | " | 147 |
| Nadeau, M. | Commission | 130 |
| Napanee Gas District | Contingencies | 146 |
| Nash, A. F. | " | 149 |
| Nash, S. C | " and salary | 125 |
| Negretti & Zambra | " | 128, 148 |
| Neil, James | Salary | 121 |
| Nelson, C. H | Refunds | 38 |
| Nelson, Nels | " | 34, 35 |
| New Brunswick Excise District | Contingencies and salary | 127 |
| Newby, F. | Salary | 138 |
| New Westminster Gas District | Contingencies and salary | 147 |
| Niagara and Youngston Ferry | Lessees | 15 |
| Nichols, J. T | Salary | 118 |
| Nicholson, D | Refunds | 36, 46 |
| Nicholson File Co | Contingencies | 144 |
| Nolan, J. C | Purchaser | 114 |
| Nolan, J. F | Refunds | 38, 41, 42, 44 |
| Noonan, H. T | Salary | 118 |
| Normandin, G | " | 122 |
| Oberndorffer, S | Refunds | 40 |
| O'Brien, E. C | Salary | 116 |
| O'Brien, James | " | 117 |
| O'Brien, J. F | " | 117 |
| Ochsner, R | Refunds | 33 |
| O'Donnell, J | Salary | 117 |
| O'Donnell, M. J | " | 123 |
| O'Donoghue, M. J | " | 116 |
| O'Dwyer, P | Refunds | 31, 34 |
| Officer's salary | " | 47 |
| O'Flaherty, E. J | Salary | 122 |
| O'Flaherty, M. J | " | 146 |
| O'Grady, D. J | Distribution of seizures | 133 |
| O'Keefe, Eugène | Refunds | 35 |
| Oland, G. W. C | " | 34, 35 |
| O'Leary, T. J | Duty-pay | 131 |
| " | Salary | 120 |
| Olivier, H | Duty-pay | 131 |
| Ontario Excise Districts | Contingencies and salaries | 127 |
| Orr, H. N | Salary | 116 |
| Orillia Brewing Co., The | Refunds | 31 |
| Osborne, F. A | Salary | 125 |
| O'Sullivan, D | " | 126 |
| Other receipts—Revenue—Comparative statement showing monthly increase or decrease for 1901-1902 and 1902-1903 | | 28-29 |
| Other receipts—Revenue from | | 7 to 9 |
| " " monthly deposits | | 24 to 27 |
| Ottawa and Kettle Island Ferry | Lessee | 15 |
| " Electric Co | " | 110 |
| " " | Contingencies | 114 |
| " " Railway Co | Lessee | 110 |
| " Excise Division | Contingencies and salaries | 118 |
| " Gas District | " salary | 146 |
| " Investment Co. | Lessee | 110 |
| " Weights and Measures Division | Contingencies and salaries | 141 |
| Otterbein, C | Refunds | 31, 34 |
| Ouellette Street Ferry, Detroit | Lesssee | 15 |
| Owen Sound Electric Light District | Contingencies and salaries | 149 |
| " Excise Division | " " | 118 |
| " Gas District | " " | 146 |
| Panneton, J. E | Salary | 122 |
| Pape, James | " | 146 |
| Papineauville and Brown's wharf | Lessee | 15 |
| Park, W. A | Commission | 129 |
| Parker, Thomas | Salary | 143 |
| Parkinson, E. B | Salaries | 126, 135 |
| Parkinson, E. B | Travelling expenses | 136 |
| Parson, C. H | Salary | 126 |
| Part of building, Portland, N.B. | " | 16 |
| *Patrie, La*, Montreal | Subscription | 139 |
| Patry, J. H | Salary | 123 |
| Patterson, C. E. A | " | 123 |

| | | PAGE. |
|---|---|---|
| Payment, T. | Contingencies | 140 |
| Payne, J. B | Refunds | 38, 43, 45 |
| Peel, A. | Lessee | 110 |
| Pedwell, W | " | 112 |
| Pelletier, N. G | Salary | 113 |
| Pelton, H. S. | Law cost. | 129 |
| Pembroke and Allumette Island Ferry (new lease) | Lessee. | 15 |
| " " " (old lease) | " | 15 |
| " *Observer* | Advertising | 135 |
| Perkins, C. | Gratuity | 128 |
| " | Vote for | 64 |
| Perkins, Lyman. | Lessee. | 110 |
| Perley & Pattee | " | 110 |
| Persons employed by Inland Revenue Department | List of | 151 to 160 |
| Perth Excise Division | Contingencies and salaries | 118 |
| Peterborough Excise Division | " " | 119 |
| " Gas District. | " salary | 146 |
| Petit, J. B | Salary. | 142 |
| Petrie, J. & J. | Lessees | 110 |
| Petroleum Inspection Fees. | | 22-23 |
| " " Comparative statement for 1901-1902 and 1902-1903 | | 97 |
| " Return of Canadian petroleum and naphtha inspected during 1902-1903 | | 96 |
| Pictou Excise Division | Contingencies and salaries. | 125 |
| " " | Distribution of seizures | 133-134 |
| " Weights and Measures Division | Contingencies and salaries | 143 |
| Pittaway, A. G | Subscription | 140 |
| Plamondon, J. D | Law costs. | 144 |
| Poirier, J. N | Salary | 124 |
| Pole, C. W | " | 116 |
| *Pontiac Advance*, The. | Advertising | 135 |
| Port Arthur Excise Division. | Contingencies and salaries | 119 |
| Portelance, P. A | Salary | 124 |
| Postmaster, Ottawa | Postage | 139 |
| Post Office Department | Bill stamp account | 19 |
| Potvin, Nap | Contingencies. | 128, 140, 144 |
| " | Salary. | 138 |
| Poulin, P | Refunds | 39 |
| Pound, J. T | Commission | 129, 130 |
| Powell, Alex | Purchaser. | 114 |
| Power, J. F. | Provisional allowance | 127 |
| " | Salary | 126 |
| Préfontaine, F. X. | " | 142 |
| Prescott Excise Division. | Contingencies and salaries | 119 |
| " and Ogdensburg Ferry | Lessee. | 15 |
| *Presse, La*, Montreal | Subscription | 139 |
| Preventive Service | General statement of expenditures and salaries | 17 |
| " | Vote for | 64 |
| Pritchard, Andrews Co., The | Contingencies | 128, 135, 136, 144, 148, 150 |
| Proteau & Carignan. | Refunds | 33 |
| Province Cigar Co. The | " | 44 |
| Provisional Allowance | | 127 |
| Provost, I | Contingencies and salary | 149 |
| Quain, Redmond | Salary. | 138 |
| Quebec Electric Light Inspection Districts | Contingencies | 149 |
| " Excise Districts | " and salaries | 127 |
| " " Division. | " " | 123 |
| " Gas District | " " | 146 |
| " Harbour Commissioners | Lessees | 110 |
| " Weights and Measures Division | Contingencies and salaries | 142 |
| Queenston and Lewiston Ferry (new lease) | Lessee | 15 |
| Quinn, J. D | Duty-pay | 131 |
| " | Salary. | 124 |
| Quyon Ferry | Lessee | 15 |
| Ralston, T | Duty-pay | 131 |
| " | Salary | 121 |
| Rankin John | Lessee | 110 |
| Ratchford, C. E. | Commission | 129, 130 |
| Rau, Mary | Refunds | 32 |
| Ray, Alex | Contingencies. | 128 |
| Raw leaf tobacco taken for consumption | | 22-23 |
| Ready, James. | Refunds | 33, 34 |
| Refunds of Revenue | | 30 to 47 |
| Registrar, Exchequer Court | Contingencies | 128 |
| Reid, John | Lessee | 110 |
| Reid, Robert (estate of) | Purchaser | 114 |
| Reinhardt, C. S. | Refunds | 32 |

| | | Page. |
|---|---|---|
| Reinhardt, L. | Refunds | 32, 35 |
| Renaud, A. H | Salary | 122 |
| Rennie, G | Contingencies and salary | 119, 146 |
| Revenue, Casual | | 21 |
| " Electric Light Inspection | | 60 |
| " Excise | | 3 to 9 |
| " Gas Inspection | | 56-57 |
| " General account | | 3 |
| " Hydraulic and other rents | | 14 |
| " Law stamps | | 49 |
| " Methylated spirits | | 62-63 |
| " Minor Public Works | | 15-16 |
| " Monthly deposits | | 24 to 27 |
| " Sundry minor revenue | | 21 |
| " Weights and Measures | | 50-51 |
| Richard, D. | Salary | 142 |
| Richelieu and Ontario Navigation Co. | Lessee | 110 |
| Richer, E. H. & Fils | Contingencies | 144 |
| Ridgman, A. H | Distribution of seizures | 134 |
| " | Salary | 126 |
| Riley, D. J | Refunds | 45 |
| Rinfret, Dr. C. I | Contingencies and salary | 127, 128 |
| Ringuet, jr. M | Salary | 125 |
| Ritchie, A. J. | " | 147 |
| Ritchie, W. | Lessee | 110 |
| Rithet, R. P. & Co., Ltd | Refunds | 45 |
| Robert, A | Salary | 139 |
| Robertson, D. and Rowland, J | Lessees | 110 |
| Robins, S. W | Salary | 141 |
| Robinson, J. A. | Refunds | 32, 35 |
| Robinson, R. S. | Salary | 119 |
| Robitaille, Cyrille | Lessee | 112 |
| Roche, H. G | Contingencies and salary | 146 |
| Rochester, John | Lessee | 110 |
| Rockliffe and Gatineau Point Ferry | " | 15 |
| Rork, Thos. | Salaries | 119, 146 |
| Ross, H. E. | " | 125, 143 |
| Ross, W | Refunds | 32, 35 |
| Ross, W. B | Contingencies | 128 |
| Ross, W. T. | Commission | 129, 130 |
| Rouleau, J. C. | Travelling expenses and others | 135 |
| " | Salary | 129 |
| Rousseau, E. H | " | 124 |
| Rowan, W. E. | " | 118 |
| Roy, J. A | Refunds | 31, 34 |
| Rudkins, W. | Contingencies and salaries | 119 |
| Rudolph, Henry | Refunds | 31, 34 |
| Ryall, C. A | " | 46 |
| Ryan, William | Salary | 122 |
| Sandwich and Detroit Ferry | Lessee | 15 |
| Sarnia Gas District | Contingencies and salary | 146 |
| *Saskatchewan Phœnix*, N.W.T | Subscription | 139 |
| *Saturday Budget*, Quebec | " | 139 |
| *Saturday Night*, Toronto | " | 139 |
| Saucier, X | Contingencies and salary | 125, 143 |
| Sault St. Marie Ferry | Lessee | 15 |
| Schlueter, W. J | Refunds | 37 |
| Schoenith, G | " | 33, 35 |
| School Trustees, Rondeau Harbour | Lessees | 110 |
| Schrader, J. H | Refunds | 46 |
| Schram, R. L. | Salary | 119 |
| Scham, W | Refunds | 31, 35 |
| Schwartz, W | " | 33, 35 |
| *Scientific American*, N.Y | Subscription | 139 |
| Scullion, W. J | Duty-pay | 131 |
| " | Salary | 122 |
| Seagram, J. E | Contingencies | 128 |
| " | Refunds | 32 |
| Seaton & Co | " | 44 |
| Seaton, R. B. & Co | " | 45 |
| Seivert, J. G | " | 41, 42, 45 |
| Seivert, T. G | " | 36 |
| Seizures—Distribution of | | 133, 134 |
| " Excise—Comparative statement showing monthly increase or decrease for 1901-1902 and 1902-1903 | | 28-29 |
| " " Recapitulation of | | |
| " " Revenue | | 6, 8 |

| | | PAGE. |
|---|---|---|
| " Revenue | Monthly deposits | 24 to 27 |
| Shanacy, M. | Contingencies and salaries | 145 |
| " | Salary | 120 |
| *Shareholder*, The, Montreal | Subscription | 139 |
| Shaw, J. F. | Salary | 138 |
| Shea, Patrick | Refunds | 32, 35 |
| Shedrick, C. E | Contingencies | 150 |
| Sherbrooke Electric Light District | " | 149 |
| " Excise Division | " and salaries | 124 |
| " " | Distribution of seizures | 133 |
| " Gas District | Contingencies and salary | 146 |
| Shrader, J. H | Refunds | 40 |
| Silver Spring Brewery, Ltd | " | 33, 35 |
| Simon, H. | " | 38, 41 |
| Simon, Leiser & Co | " | 43 |
| Simpson, A. F. | Contingencies and salaries | 124, 146, 149 |
| " | Distribution of seizures | 133 |
| Simpson, W. A. | Salary | 119 |
| Sinon, E. H | Contingencies and salary | 116 |
| Skead late Hon. James (Estate of) | Lessee | 110 |
| Skelly, W. H | Refunds | 39 |
| Skinner, H. & Co | " | 47 |
| Slattery, Ralph | Salary | 118 |
| Slattery, Thomas | " | 141 |
| Sleeman, G | Refunds | 32, 33 |
| Sleeman, B. & M. Co., The | " | 34 |
| Sloan, Wm. | Salary | 116 |
| Smith, J. | Refunds | 38, 41, 44 |
| Smith, J. C. | Salary | 141 |
| Snowden, J. W | " | 122 |
| Snuff, Quantity taken for consumption | | 22-23 |
| Solomon, E. | Refunds | 39, 41, 42, 43, 44, 45, 46 |
| Sparling, J. W | Salary | 125 |
| Speers, Jacob Duke | Lessee | 112 |
| Spence, F. H. | Salary | 116 |
| Spereman, J. J | " | 117 |
| Spirits—Distilleries, transactions | | 68-69 |
| " License fees | | 22-23 |
| " Licenses issued, materials used and quantities produced | | 66 |
| " " " " comparative statement for 1901-1902 and for 1902-1903 | | 67 |
| " Quantity taken for consumption | | 22-23 |
| " Revenue | | 6, 8 |
| " " Comparative statement showing monthly increase or decrease for 1901-1902 and 1902-1903 | | 28-29 |
| " " Refunds | | 30, 31 |
| " " Return of manufactures | | 66 |
| " " Warehouse returns | | 70-71 |
| " " " Comparative statement for 1901-1902 and 1902-1903 | | 72-73 |
| Spratt, Joseph | Lessee | 110 |
| Sproule, W. H. | Contingencies | 140, 150 |
| Stamps—Bill—Distributors' account | | 19 |
| " Electric Light Distributors' account | | 60 |
| " " Revenue | | 49 |
| " Gas Distributors' account | | 56-57 |
| " " Revenue | | 49 |
| " Law Distributors' account | | 20 |
| " " Revenue | | 49 |
| " Revenue | | 49 |
| " Weights and Measures Distributors' account | | 50-51 |
| " " " Revenue | | 49 |
| Standish, J. G | Duty-pay | 131 |
| Standish, J. G | Salary | 116 |
| Stevens, D. B | " | 126 |
| Stewart, James | " | 117 |
| Stratford Excise Division | Contingencies and salaries | 119 |
| " Gas District | " salary | 146 |
| Stratton, W. C | " " | 127, 128 |
| Steel, J. J | Refunds | 32, 35 |
| Stevenson, G | Contingencies | 143 |
| Stevenson, J. K. | Commission | 130 |
| Stevenson, Thos | Refunds | 31, 34 |
| Storr, A. M | Cartage | 139, 144 |
| Street, A. F | Commission | 129 |
| Stuart, W. E | Salary | 145 |
| Sullivan, Timothy | Purchaser | 114 |

| | | Page. |
|---|---|---|
| Sundry Minor Revenue | General statement of | 21 |
| Superior, B. & M. Co., Ltd | Refunds | 34, 35 |
| Swannell, F. W | Salary | 126 |
| Swift, E. G | Refunds | 30, 31 |
| St. Catharines Excise Division | Contingencies and salaries | 119 |
| St. Hyacinthe Electric Light District | " " | 149 |
| " Excise Division | " " | 124 |
| " Gas District | Salary | 146 |
| " Weights and Measures Division | Contingencies and salaries | 142 |
| St. John (N.B.) Electric Light Inspection District | " " | 149 |
| " Excise Division | " " | 124 |
| " Gas District | " " | 147 |
| " Weights and Measures Division | " " | 142 |
| St. Laurent, G | Contingencies | 144 |
| St. Léonard and Van Buren Ferry | Lessee | 15 |
| St. Michel, F. X | Salary | 123 |
| Taché, P. C | Law costs | 129 |
| Talbot, J | Salary | 118 |
| Tansey, C. E | Refunds | 38, 45 |
| Tate, Robt | " | 34 |
| Taylor, G. W | Duty-pay | 131 |
| " | Salary | 121 |
| Taylor, J | Refunds | 45 |
| Taylor, A, J | " | 33 |
| Taylor, T. B | " | 32, 35 |
| Teetzel, Jas. V. (*see* Feetzel, Jas. O.) | Law Costs | 129 |
| Tellier, J. A | " | 46 |
| *Temps, Le*, Ottawa | Subscription | 139 |
| Tennant, J. F | Commission | 129, 130 |
| Tétreau, Nérée | Lessee | 110 |
| Tétreault, J | Salary | 124 |
| The Alaska Express Co | Express charges | 135 |
| The Bell Telephone Co | Messages | 139 |
| The Bronson Co | Lessee | 110 |
| The Bronson & Weston Lumber Co | " | 110 |
| *The Catholic Record*, London | Subscription | 139 |
| *The Chronicle* Publishing Co., Halifax, N. S | " | 139 |
| *The Citizen*, Ottawa | " | 139 |
| The Corporation of the town of Thorold | Refunds | 47 |
| *The Daily Telegraph*, Quebec | Subscription | 139 |
| *The Daily Witness*, Montreal | " | 139 |
| *The Eganville Leader* | Advertising | 135 |
| The Electric Storage Co | Contingencies | 150 |
| *The Examiner*, Sherbrooke | Subscription | 139 |
| *The Farmer's Advocate* | " | 139 |
| The Frontenac Milling Co | Lessee | 110 |
| *The Gazette*, Montreal | Subscription | 139 |
| The G. E. Tucket & Son Co | Refunds | 36, 37, 38, 39, 40, 41, 42, 43 44, 45 |
| The Gourie & Black House Collieries, Ltd | Lessee | 110 |
| *The Hawkesbury Post* | Contingencies | 135 |
| *The Evening Journal*, Ottawa | Subscription | 130 |
| *The News* Printing Co., Toronto | " | 139 |
| The Ottawa Electric Co | Contingencies | 150 |
| *The Ottawa Valley Advocate* | Advertising | 135 |
| The Packkard Electric Co | Contingencies | 150 |
| *The Pontiac Advance* | Advertising | 135 |
| The Pritchard & Andrews Co | Contingencies | 128, 135, 136, 144, 148, 150 |
| *The Shareholder*, Montreal | Subscription | 139 |
| *The Star*, Montreal | " | 139 |
| *The Toronto World* | " | 139 |
| Thelin, J. C | Refunds | 43 |
| Thomas, J. S | Salary | 141 |
| Thomas, R | Duty-pay | 131 |
| " | Salary | 121 |
| Thompson, Abraham | Purchaser | 114 |
| Thompson & Perkins | Lessees | 110 |
| Thorburn, Jas | Provisional allowance | 127 |
| " | Salary | 126 |
| Thornton & Truman | Contingencies | 128, 144 |
| Three Rivers Electric Light District | " and salary | 149 |
| " " Excise Division | " Salaries | 124 |
| " " Weights and Measures Division | " " | 142 |
| Tietzen, W | Refunds | 39, 44 |
| Till, T. M | Salary | 116 |
| *Times* Printing Co., Hamilton | Subscription | 139 |
| Timmons, J. F | Refunds | 41 |
| Timmons, P | Salary | 123 |

| | | Page. |
|---|---|---|
| Tobacco, Canadian Twist | Commission on sale of stamps | 130 |
| " " " | Comparative statement for 1901-1902 and 1902-1903 | 89 |
| " " " | Quantity taken for consumption | 22-23 |
| " " " | Statement of the revenue collected for year 1902-1903 | 89 |
| " License fees | | 22-23 |
| " " comparative statement for 1901-1902 and 1902-1903 | | 83 |
| " " issued, material used and quantity produced | | 82 |
| " Quantity taken for consumption | | 22-23 |
| " Raw leaf | | 22-23 |
| " " scrap and cuttings, duty collected on actual weights | | 86-87 |
| " " warehouse returns | | 86-87 |
| " " " comparative statement for 1901-1902 and 1902-1903 | | 88 |
| " Revenue | | 6, 8 |
| " " comparative monthly statement showing increase or decrease for 1901-1902 and 1902-1903 | | |
| " " refunds | | 36 to 46 |
| " " warehouse returns | | 84 |
| " " " comparative statement for 1901-1902 and 1902-1903 | | 85 |
| " Snuff—Quantity taken for consumption | | 22-23 |
| " Stamps | Commission | 130 |
| " " | " vote for | 64 |
| Tobin, John & Co. | Refunds | 36, 37, 39, 40, 41, 42, 43, 44 |
| Tomlinson, W. M. | Salary | 142 |
| Tompkins, P. | " | 125 |
| Toronto Brew. and Malt Co | Refunds | 32, 34, 35 |
| Toronto Electric Light Inspection District | Contingencies | 149 |
| " Excise Division | " and salaries | 120 |
| " " | Distribution of seizures | 133 |
| " Gas District | Contingencies and salaries | 146 |
| " Weights and Measures Division | " " | 141 |
| Toronto *World*, The | Subscription | 139 |
| Toupin, F. X. J. A. | Distribution of seizures | 133 |
| " | Salary | 122 |
| Tracy, J. P. | " | 118 |
| Trasher, W. A. | " | 117 |
| Traversy, F. X. | Duty-pay | 131 |
| *Tribune, La*, St. Hyacinthe | Subscription | 139 |
| Tuckett Cigar Co., The, Ltd | Refunds | 36, 37, 39, 41, 42, 43, 45, 46 |
| Tuckett & Son Co., The, G. E. | " | 36, 37, 38, 39, 40, 41, 42, 43, 44, 46 |
| Ulmann, E. | Contingencies | 144 |
| Union Brewing Co. | Refunds | 33 |
| Valade, F. X. | Food analysis | 136 |
| Valin, J. A. | Extra services | 137 |
| Valin, J. E. | Salary | 138 |
| Valleau, A. S. | Commission | 129, 130 |
| Vancouver Breweries, Ltd | Refunds | 34 |
| " Excise Division | Contingencies and salaries | 126 |
| " " | Distribution of seizures | 134 |
| " Gas District | Contingencies and salaries | 147 |
| Vasseur, S. N. | Salary | 124 |
| Verner, F. | " | 122 |
| Verner, T. H. | " | 125 |
| Victoria Electric Light District | Contingencies | 150 |
| " Excise Division | " and salaries | 126 |
| " Gas District | " and salary | 147 |
| " Weights and Measures Division | " and salaries | 143 |
| Victoria Phœnix Brewing Co | Refunds | 33, 34 |
| Vinegar | License fees | 22-23 |
| Vinegar | Duty accrued | 22-23 |
| " Revenue, comparative statement of manufactures for the Years 1901-02 and for 1902-03 | | 101 |
| " Statement showing number of gallons manufactured in 1902-1903 | | 99 |
| Vincent, Arthur | Contingencies | 144 |
| Wainwright, F. G. | Salary | 125 |
| Walkerville Brewing Co., Ltd | Refunds | 33 |
| Walker, J. H. | Salary | 125 |
| Waller, John | Duty-pay | 131 |
| " | Salary | 119 |
| Walsh, D. J. | Duty-pay | 131 |
| " | Salary | 116, 123 |
| Ward, D. | Refunds | 38 |
| Ward, W. | " | 38, 39, 40, 41, 42 |
| Wardell, R. S. R. | Salary | 117 |
| Warren, G. S. | Distribution of seizures | 133 |
| Watson, Miss. A. | Extra services | 139 |

| | | PAGE. |
|---|---|---|
| Watson, George | Commission | 129, 130 |
| Watson, James | Salary | 135 |
| Watson, John | Refunds | 31, 35 |
| Watson, W. W. | Salary | 125 |
| Waugh, Richard J | Salaries | 135, 143 |
| " | Travelling expenses | 136 |
| Webbe, C. E. A | Salary | 118 |
| Webster, W. R. | Refunds | 44 |
| Weights and Measures | Contingencies, vote for | 64 |
| " " | Deputy Inspector's account (old divisions). | 52 |
| " " | Expenditures (old divisions) | 55 |
| " " | " pages 53-54—Details of | 141 to 144 |
| " " | Inspection Divisions in account with expenditure | 53-54 |
| " " | Inspection Divisions in account with revenue | 50-51 |
| " " | Inspectors' account | 50-51 |
| " " | Monthly deposits | 24 to 27 |
| " " | Revenue | 49 |
| " " | Salaries, vote for | 64 |
| " " | Special vote for | 64 |
| " " | Stamps revenue | 49 |
| Weir, James | Duty-pay | 131 |
| " | Salary | 117, 120 |
| Weis, Frank | Refunds | 41 |
| Westman, Thomas | Salary | 138 |
| Weston Electrical Instrument Co | Contingencies | 150 |
| Weyms, C | Duty-pay | 131 |
| " | Salary | 116 |
| Whaley, H. R | Refunds | 39, 45 |
| Wheatley, A. E. | Salary | 141 |
| White, J. A | " | 146 |
| White, J. B | " | 119 |
| White, T. F | Refunds | 33 |
| Whitehead, J. P | Salary | 118 |
| Whitehead, Mrs. J | Contingencies | 128 |
| Whitney, A | Refunds | 35 |
| Whyte, J. A | Salary | 146 |
| Wiarton Docks | Lessee | 16 |
| Wickwire, W. N. | Refunds | 33, 34, 35 |
| Williams, S. | Lessee | 110 |
| Wilmot, J. B. | Contingencies and salary | 142 |
| Wilson, Andrew | Refunds | 39, 40, 43, 45 |
| Wilson, D | Salary | 117 |
| Wilson, D. H. | Refunds | 33, 35 |
| Wilson, J. E | Contingencies and salary | 147, 149 |
| Wilson, M. S. | Refunds | 32, 35 |
| Windsor Excise Division | Contingencies and salaries | 121 |
| " Weights and Measures Division | " " | 141 |
| Winnipeg Excise Division | " " | 125 |
| " Gas District | " and salary | 140 |
| " Weight and Measures Division | " and salaries | 143 |
| Winsor, J. | Salary | 141 |
| Winter, E. J | Refunds | 45 |
| Winterhalt, J. | " | 38, 45 |
| Wiser, J. P. | " | 33 |
| Wiser, J. P. & Sons | Salary | 128 |
| Witteman, K | Refunds | 32, 35 |
| Wolfenden, W | Contingencies and salaries | 126, 147 |
| Wood, J. A. | Salary | 119 |
| Woodward, G. W | Duty-pay | 131 |
| " " | Salary | 116 |
| Wright, Miss S. E | Salary | 135 |
| Wright, R. J. | " | 141 |
| Yetts, Robert P | " | 138 |
| Young, Levi | Lessee | 110 |
| Young, R. E. | Salary | 119 |
| Younheart, Ed | Refunds | 39 |
| Yukon Hardware Co | Contingencies | 135 |

# REPORT, RETURNS AND STATISTICS

OF THE

# INLAND REVENUES

OF THE

# DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED JUNE 30

1903

## PART II

## INSPECTION OF WEIGHTS AND MEASURES, GAS AND ELECTRIC LIGHT

*PRINTED BY ORDER OF PARLIAMENT*

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY
1903

# REPORT

OF THE

# DEPUTY MINISTER OF INLAND REVENUE

ON THE

## INSPECTION OF WEIGHTS AND MEASURES, GAS AND ELECTRIC LIGHT

To the Honourable
The Minister of Inland Revenue.

SIR,—I have the honour to submit herewith my annual report on the inspection of weights and measures, gas and electric light, with the usual statements in connection therewith, for the fiscal year ended June 30, 1903.

1. The total revenue collected during the year for the inspection of weights and measures was $64,327.65, as against $62,937.68 collected during the year ended June 30, 1902.

2. The total expenditure was $87,507.60, as against $76,418.32 expended during the year ended June 30, 1902.

3. Appendix 'A' gives a summary statement of the receipts and expenditures of each inspection division.

4. In Appendices 'B' 'C' and 'D' will be found a detailed statement of weights, measures and weighing machines presented for verification, verified and rejected during the year. The number of all descriptions may be summarily stated as follows:—

| —— | Presented. | Verified. | Rejected. | Percentage of Rejections. |
|---|---|---|---|---|
| Weights, Dominion | 62,976 | 60,784 | 2,192 | 3·47 |
| Measures of capacity, Dominion | 102,091 | 102,019 | 72 | 0·07 |
| Lineal measures | 7,772 | 7,573 | 199 | 2·43 |
| Balances, equal arms | 12.483 | 12,225 | 258 | 2·00 |
| " steelyards | 4,634 | 4,533 | 101 | 2·18 |
| " platform scales | 33,830 | 32,992 | 838 | 2·47 |
| Troy weights | 19 | 6 | 13 | 68·42 |
| Irregular weights | 706 | 664 | 42 | 5·94 |
| " measures | 1,105 | 1,102 | 3 | 0·27 |
| " balances | 9,290 | 9,188 | 102 | 1·09 |

## INSPECTION OF GAS.

5. The total revenue collected during the fiscal year ended June 30, 1903, for the inspection of gas and gas meters, was $25,159.80, as compared with $24,221.80 collected during the year ended June 30, 1902.

6. The total expenses were $25,566.68, as against $24,066.80 expended during the year ended June 30, 1902.

7. Appendix 'E' gives a summary statement of the receipts and expenditures of each gas inspection district.

8. A statement of the illuminating power and purity of gaz inspected during the year will be found in Appendix 'F'.

9. The illuminating power, where inspection has been made, has been as follows :—

| Places. | Number of Tests made. | Number of times below Standard. | Places. | Number of Tests made. | Number of times below Standard. |
|---|---|---|---|---|---|
| Barrie | 12 | | Stratford | 12 | |
| Belleville | 26 | 1 | St. Catharines | 12 | |
| Berlin | 17 | | St. Thomas | 12 | 1 |
| Brantford | 12 | | Toronto | 105 | |
| Brockville | 12 | | Windsor | 12 | |
| Chatham | 13 | 7 | Woodstock | 12 | |
| Cobourg | 12 | | Montreal | 105 | |
| Cornwall | 12 | | Quebec | 12 | |
| Deseronto | | | Sherbrooke | 12 | |
| Dundas | 12 | | St. Hyacinthe | 5 | |
| Galt | 12 | | Fredericton | 68 | 16 |
| Guelph | 12 | | Moncton | 12 | |
| Hamilton | 24 | | St. John, N.B. | 66 | 2 |
| Ingersoll | 12 | | Halifax | 12 | |
| Kingston | 24 | | Pictou | 11 | |
| Listowel | 12 | | Yarmouth | 11 | |
| London | 24 | | Charlottetown | 14 | 1 |
| Napanee | 12 | | Winnipeg | 12 | |
| Ottawa | 24 | | Nanaimo | 12 | |
| Owen Sound | 12 | | New Westminster | 12 | |
| Peterborough | 23 | | Vancouver | 12 | |
| Port Hope | 12 | | Victoria | 12 | |
| Sarnia | 11 | | | | |

The revenue derived from the inspection of electric light was as follows:—

| | |
|---|---|
| Fees for inspection of meters, &c | $19,739 75 |
| Registration of companies | 4,155 00 |
| | $23,894 75 |
| The expenses of inspection (annual) | 8,500 74 |
| | $15,394 01 |
| Expended on standard instruments, &c | 1,939 05 |
| Leaving a net revenue of | $ 13,454 96 |

Since the year 1896–97 the two services of gas and electric light inspection, which are conducted largely by the same staff of officers, have reached that point at which they have ceased to be a burden upon the general taxpayer, as shown below:—

| Years. | Gas and Electric Light. | |
|---|---|---|
| | Revenue. | Expenditure, Exclusive of cost of Standard Instruments. |
| | $ cts. | $ cts. |
| 1898–99 | 30,015 25 | 23,436 30 |
| 1899–1900 | 35,523 50 | 26,424 48 |
| 1900–01 | 37,536 57 | 28,247 20 |
| 1901–02 | 45,663 05 | 33,328 48 |
| 1902–03 | 49,054 55 | 36,006 47 |

The kindred service of weights and measures inspection, it will be observed, earns about three-fourths of its annual cost, the expenditure as already stated having been $87,507.60, against a revenue of $64,327.65.

The Department, having secured foi Chief Inspector of Weights and Measures a gentleman of long experience as a manufacturer of scales, believes that within a short period of time this branch of the service will be brought to a very much greater state of efficiency.

The Chief Inspector has already visited many inspection districts in the eastern portion of the Dominion, and will, within this fiscal year, be able to inspect the remaining districts.

Sample sets of metric weights and measures are still being supplied to educational institutions throughout the country. Up to the present time over 300 of these sets have been sent out from the Department.

I have the honour to be, sir,
Your obedient servant,

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, August 18, 1903.

# APPENDIX A

Statement of Weights and Measures Expenditures and Receipts for the year ended June 30, 1903.

| Divisions. | Inspectors. | Expenditures. | | | | | | Receipts. |
|---|---|---|---|---|---|---|---|---|
| | | Salaries. | Special assistance. | Rent. | Travelling expenses. | Sundries. | Total. | |
| | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Belleville.... | Johnson, Wm ....<br>Slattery, T........<br>Irwin, S ..........<br>Behan, J. J ....<br>Errett, R. W.....<br>Johnston, Chas. W | 3,449 96 | 499 92 | 314 17 | 1,186 41 | 521 26 | 5,971 72 | 4,063 50 |
| Hamilton .. | Freed, A. T.......<br>McDonald, J ....<br>Marentette, A....<br>Fitzgerald, E. W..<br>Laidman, R. H. .<br>Wheatley, E. A ..<br>Jarvis, H ........<br>Robins, S. H.... | 6,499 84 | ........ | ........ | 1,247 36 | 97 08 | 7,844 28 | 8,813 24 |
| Ottawa...... | Macdonald, J. A..<br>Elliott, T. H .....<br>McFarlane, Jas...<br>Breen, J...... ...<br>Winsor, J....... .<br>Findley, Robt ... | 4,165 10 | ........ | 250 00 | 1,333 26 | 205 88 | 5,954 24 | 8,434 73 |
| Toronto ... | Kelly, D ........<br>Milligan, R. J....<br>Wright, R........<br>Murdoch, J.....<br>Smith, J. C. . ... | 4,199 72 | ........ | ....... | 1,665 74 | 109 61 | 5,975 07 | 6,394 99 |
| Windsor...... | Hayward, W. J...<br>Coughlin, D ... .<br>Thomas, J. S.....<br>Hughes, R. A .... | 3,749 84 | ........ | ... ... | 1,426 91 | 128 42 | 5,305 17 | 7,598 19 |
| | Ontario ........ | 22,064 46 | 499 92 | 564 17 | 6,859 68 | 1,062 25 | 31,050 48 | 35,304 65 |

## APPENDIX A—*Continued.*

STATEMENT of Weights and Measures Expenditures and Receipts for the Year ended June 30, 1903—*Continued.*

| Divisions. | Inspectors. | Expenditures. | | | | | | Receipts. |
|---|---|---|---|---|---|---|---|---|
| | | Salaries. | Special assistance | Rent. | Travelling expenses. | Sundries. | Total. | |
| | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Montreal | Chalus, J. O.<br>Daoust, J. A.<br>Gervais, S.<br>Hébert, J. A. P.<br>Boudet, E.<br>Collins, D.<br>Baker, J. S.<br>Dessert, V. | 6,949 64 | ..... .. | ........ | 1,200 35 | 297 99 | 8,447 98 | 10,825 85 |
| Quebec | Guay, Geo. N.<br>LeBel, J. A. W.<br>Kelly, M. J.<br>Guay, A.<br>Chabot, F. X.<br>Petit, J. B.<br>Préfontaine, F.<br>Knowles, Chs.<br>Moreau, A. | 6,191 85 | ...... . | ........ | 1,850 91 | 158 23 | 8,200 99 | 4,526 59 |
| St. Hyacinthe | Morin, J. P.<br>Tomlinson, W. M<br>Fournier, L. A.<br>Beaulac, J. H.<br>Thérien, J. F. | 2,141 54 | 60 47 | ........ | 636 05 | 65 39 | 2,903 45 | 1,778 73 |
| Three Rivers | Gravel, A. L.<br>Beaulac, J. H.<br>Bolduc, E. | 1,916 48 | ........ | ........ | 580 05 | 14 56 | 2,511 09 | 1,474 15 |
| | Quebec | 17,199 51 | 60 47 | ........ | 4,267 36 | 536 17 | 22,063 51 | 18,605 32 |
| St. John | Wilmot, J. B<br>Barry, Jas.<br>Cowan, E.<br>Richard, D<br>Bernier, J. A. | 2,906 44 | ........ | ...... | 337 93 | 20 66 | 3,265 03 | 1,180 79 |
| Cape Breton | Laurence, G. C. | 800 00 | ........ | 50 00 | 438 75 | 28 86 | 1,317 61 | 544 98 |
| Halifax | Frame, A.<br>Waugh, R. J.<br>Sargent, W. | 1,599 96 | 866 58 | 375 00 | 307 80 | 151 55 | 3,300 89 | 933 45 |
| Pictou | Dustan, W. M.<br>Chisholm, J. J. | 1,600 00 | ........ | ... .... | 252 00 | 79 09 | 1,931 09 | 905 11 |
| | Nova Scotia | 3,999 96 | 866 58 | 425 00 | 998 55 | 259 50 | 6,549 59 | 2,383 54 |
| Charlottetown P.E.I. | Davy, E.<br>Hughes, H | 1,549 92 | ........ | ........ | 160 75 | 51 36 | 1,762 03 | 471 94 |

## APPENDIX A—*Concluded.*

STATEMENT of Weights and Measures Expenditures and Receipts for the Year ended June 30, 1903—*Concluded.*

| Divisions. | Inspectors. | Expenditures. | | | | | | Receipts. |
|---|---|---|---|---|---|---|---|---|
| | | Salaries. | Special assistance | Rent. | Travelling expenses. | Sundries. | Total. | |
| | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Winnipeg, Man. | Magness, R.....<br>McDonald, A.W.<br>Gridlestone, R. J. M.<br>Ross, H. E ....<br>McKay, R......<br>Gilby, W. F..... | 2.999 84 | 902 34 | 75 00 | 1,630 56 | 192 63 | 5.800 77 | 4,778 81 |
| Calgary, N.W.T. | Saucier, X. ....<br>Costello, J. W. .. | 915 48 | ....... | ........ | 295 85 | ......... | 1,211 33 | 684 75 |
| Victoria .... | Findley, H......<br>McAloney, J. A..<br>Parker, Thos .... | 1,749 84 | ........ | 180 00 | 1,455 16 | 96 22 | 3,481 22 | 917 85 |

### RECAPITULATION.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Ontario .... | 22,064 46 | 499 92 | 564 17 | 6,859 68 | 1,062 25 | 31,050 48 | 35,304 65 |
| Quebec .... | 17,199 51 | 60 47 | ....... | 4,267 36 | 536 17 | 22,063 51 | 18,605 32 |
| New Brunswick .... | 2,906 41 | ........ | ....... | 337 93 | 20 66 | 3,265 03 | 1,180 79 |
| Nova Scotia .... | 3,999 96 | 866 58 | 425 00 | 998 55 | 259 50 | 6,549 59 | 2,383 54 |
| Prince Edward Island .... | 1,549 92 | ........ | ........ | 160 75 | 51 36 | 1,762 03 | 471 94 |
| Manitoba .... | 2,999 84 | 902 34 | 75 00 | 1,630 56 | 192 63 | 5,800 37 | 4,778 81 |
| North-west Territories .... | 915 48 | ........ | ....... | 295 85 | ........ | 1,211 33 | 684 75 |
| British Columbia .... | 1,749 84 | ........ | 180 00 | 1,455 16 | 96 22 | 3,481 22 | 917 85 |
| Chief Inspector .... | 1,794 33 | ........ | ....... | 241 35 | ........ | 2,035 68 | ........ |
| General contingencies .... | ........ | ........ | ........ | ........ | 8,902 65 | 8,902 65 | ........ |
| Printing .... | ........ | ........ | ........ | ........ | 1,174 28 | 1,174 28 | ........ |
| Stationery .... | ........ | ........ | ........ | ........ | 211 43 | 211 43 | ........ |
| Grand totals .... | 55,179 78 | 2,329 31 | 1,244 17 | 16,247 19 | 12,507 15 | 87,507 60 | 64,327 65 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

# APPENDIX

RETURN of Weights and Measures Inspected during the Fiscal Year ended June 30, each Division, for each Province,

| Inspection Offices. | Weights. | | | | | | | | | Measures of Capacity. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dominion. | | | Troy. | | | Miscellaneous | | | Dominion. | | | Miscellaneous | | |
| | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. |
| *Ontario.* | | | | | | | | | | | | | | | |
| Belleville | 3,139 | 3,139 | .... | 6 | 6 | .... | 7 | 7 | .... | 9,483 | 9,483 | .... | 14 | 14 | .... |
| Hamilton | 9,448 | 9,448 | ... | .... | .... | .... | .... | .... | ... | 5,212 | 5,210 | 2 | 31 | 31 | .. |
| Ottawa | 2,578 | 2,510 | 68 | .... | .... | .... | .... | .... | ... | 2,123 | 2,073 | 50 | 11 | 11 | .. |
| Toronto | 5,671 | 5,671 | .... | 13 | .... | 13 | .... | .... | .... | 15,190 | 15,190 | ... | 361 | 361 | .... |
| Windsor | 4,423 | 4,423 | .. | .... | .... | .... | ... | .... | .... | 19,985 | 19,985 | .... | .... | .... | .... |
| Totals | 25,259 | 25,191 | 68 | 19 | 6 | 13 | 7 | 7 | .. | 51,993 | 51,941 | 52 | 417 | 417 | .... |
| *Quebec.* | | | | | | | | | | | | | | | |
| Montreal | 13,101 | 12,891 | 210 | ... | .... | .... | 123 | 123 | ... | 27,337 | 27,335 | 2 | 360 | 359 | 1 |
| Quebec | 12,472 | 10,565 | 1907 | .... | .... | .... | 545 | 503 | 42 | 9,322 | 9,308 | 14 | 62 | 61 | 1 |
| St. Hyacinthe | 2,077 | 2,075 | 2 | .. | .... | .... | .... | .... | .... | 2,379 | 2,379 | .... | 40 | 40 | .... |
| Three Rivers | 2,346 | 2,346 | .... | .... | .... | ... | . | .... | .... | 1,634 | 1,632 | 2 | 21 | 21 | .... |
| Totals | 29,996 | 27,877 | 2,119 | ... | .... | .. | 668 | 626 | 42 | 40,672 | 40,654 | 18 | 483 | 481 | 2 |
| *New Brunswick.* | | | | | | | | | | | | | | | |
| St. John | 1,155 | 1,155 | .... | .... | .... | .. | 1 | 1 | ... | 3,584 | 3,584 | ... | 35 | 35 | . |
| *Nova Scotia.* | | | | | | | | | | | | | | | |
| Cape Breton | 425 | 421 | 4 | . | ... | .... | ... | .. | .... | 381 | 380 | 1 | 3 | 3 | .... |
| Halifax | 1,683 | 1,682 | 1 | . | .... | .... | 17 | 17 | .. | 1,187 | 1,186 | 1 | 45 | 44 | 1 |
| Pictou | 789 | 789 | .... | .... | ... | ... | 13 | 13 | ... | 1,273 | 1,273 | .... | 29 | 29 | ... |
| Totals | 2,897 | 2,892 | 5 | .... | .... | .. | 30 | 30 | .... | 2,841 | 2,839 | 2 | 77 | 76 | 1 |
| *Prince Edward Island.* | | | | | | | | | | | | | | | |
| Charlottetown | 719 | 719 | ... | .... | ... | .... | .... | .... | ... | 385 | 385 | ... | 5 | 5 | .... |
| *Manitoba.* | | | | | | | | | | | | | | | |
| Winnipeg | 1,961 | 1,961 | ... | ... | .... | .... | .... | ... | .. | 1,920 | 1,920 | .... | 69 | 69 | ... |
| *North-west Territories.* | | | | | | | | | | | | | | | |
| Calgary | 330 | 330 | .... | .... | .... | ... | .... | ... | . . | 334 | 334 | .... | 11 | 11 | .... |
| *British Columbia.* | | | | | | | | | | | | | | | |
| Victoria | 659 | 659 | .. . | ... | .... | .... | .... | .... | .. | 362 | 362 | .... | 8 | 8 | .... |

## B.

1903, showing the Total Number brought for Verification, Verified and Rejected, for and for the whole Dominion.

| Measures of Length. | | | Balances, &c. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Equal Armed. | | | Steelyards. | | | Platform scales. Weigh Bridges, &c. | | | Miscellaneous Balances. | | |
| Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. |
| 660 | 600 | .... | 591 | 591 | .... | 142 | 142 | .... | 1,803 | 1,803 | ..... | 87 | 87 | .... |
| 476 | 424 | 52 | 2,468 | 2,395 | 73 | 2,215 | 2,197 | 18 | 6,363 | 6,047 | 316 | 805 | 801 | 4 |
| 435 | 429 | 6 | 484 | 449 | 35 | 6 | 5 | 1 | 1,695 | 1,619 | 76 | 6,421 | 6,332 | 89 |
| 745 | 745 | .... | 1,149 | 1,149 | .. | 396 | 396 | ... | 2,809 | 2,809 | ... | 740 | 740 | .... |
| 257 | 257 | .... | 838 | 834 | 4 | 245 | 243 | 2 | 4,403 | 4,358 | 45 | 41 | 41 | .... |
| 2,513 | 2,455 | 58 | 5,530 | 5,418 | 112 | 3,004 | 2,983 | 21 | 17,073 | 16,636 | 437 | 8,094 | 8,001 | 93 |
| 2,983 | 2,981 | 2 | 2,852 | 2,810 | 42 | 1,026 | 972 | 54 | 6,284 | 6,145 | 139 | 485 | 477 | 8 |
| 1,247 | 1,117 | 130 | 1,793 | 1,723 | 70 | 258 | 248 | 10 | 2,344 | 2,214 | 130 | 151 | 151 | .... |
| 189 | 186 | 3 | 342 | 314 | 28 | 95 | 83 | 12 | 1,199 | 1,155 | 44 | 31 | 31 | .... |
| 158 | 158 | .... | 402 | 402 | ... | 27 | 27 | .... | 968 | 968 | .... | 7 | 7 | .... |
| 4,577 | 4,442 | 135 | 5,389 | 5,249 | 140 | 1,406 | 1,330 | 76 | 10,795 | 10,482 | 313 | 674 | 666 | 8 |
| 5 | 5 | .... | 200 | 199 | 1 | 6 | 6 | .... | 872 | 868 | 4 | 49 | 49 | .... |
| 115 | 109 | 6 | 91 | 90 | 1 | 17 | 14 | 3 | 294 | 292 | 2 | 18 | 18 | .... |
| 116 | 116 | ... | 348 | 345 | 3 | 28 | 27 | 1 | 581 | 559 | 22 | 75 | 75 | .... |
| 100 | 100 | .... | 156 | 156 | .... | 18 | 18 | .... | 472 | 463 | 9 | 24 | 24 | ... |
| 331 | 325 | 6 | 595 | 591 | 4 | 63 | 59 | 4 | 1,347 | 1,314 | 33 | 117 | 117 | .... |
| 8 | 8 | .... | 127 | 127 | .... | 18 | 18 | ... | 343 | 343 | ... | 11 | 11 | .... |
| 181 | 181 | ... | 437 | 436 | 1 | 89 | 89 | .... | 2,512 | 2,463 | 49 | 221 | 221 | .... |
| 145 | 145 | .... | 66 | 66 | ... | 18 | 18 | ... | 337 | 335 | 2 | 57 | 56 | 1 |
| 12 | 12 | .... | 139 | 139 | .... | 30 | 30 | .... | 551 | 551 | ... | 67 | 67 | .... |

## APPENDIX

RETURN of Weights and Measures Inspected during the Fiscal Year ended June 30,
each Division, for each Province,

### RECAPIT

| Inspection Offices. | Weights. | | | | | | | | | Measures of Capacity. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dominion. | | | Troy. | | | Miscellaneous | | | Dominion. | | | Miscellaneous | | |
| | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. |
| Ontario | 25,259 | 25,191 | 68 | 19 | 6 | 13 | 7 | 7 | .... | 51,993 | 51,941 | 52 | 417 | 417 | .... |
| Quebec | 29,996 | 27,877 | 2,119 | .... | .... | .... | 668 | 626 | 42 | 40,672 | 40,654 | 18 | 483 | 481 | 2 |
| New Brunswick | 1,155 | 1,155 | .... | .... | .... | .... | 1 | 1 | .... | 3,584 | 3,584 | .... | 35 | 35 | .... |
| Nova Scotia | 2,897 | 2,892 | 5 | .... | .... | .... | 30 | 30 | .... | 2,841 | 2,839 | 2 | 77 | 76 | 1 |
| Prince Edward Island | 719 | 719 | .... | .... | .... | .... | .... | .... | .... | 385 | 385 | .... | 5 | 5 | .. |
| Manitoba | 1,961 | 1,961 | .... | .... | .. | .... | .... | .... | ... | 1,920 | 1,920 | .... | 69 | 69 | .... |
| British Columbia | 659 | 659 | .... | .... | .... | .... | .... | .... | ... | 362 | 362 | .... | 8 | 8 | .... |
| North-west Territories | 330 | 330 | ... | ... | ... | .... | .... | .... | .... | 334 | 334 | .... | 11 | 11 | .... |
| Grand totals | 62,976 | 60,784 | 2,192 | 19 | 6 | 13 | 706 | 664 | 42 | 102,019 | 102,019 | 72 | 1,105 | 1,102 | 3 |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

B—*Concluded.*

1903, showing the Total Number brought for Verification, Verified and Rejected, for and for the whole Dominion.

ULATION.

| Measures of Length. | | | Balances, &c. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Equal Armed. | | | Steelyards. | | | Platform Scales, Weigh Bridges, &c. | | | Miscellaneous Balances. | | |
| Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. | Brought for Verification. | Verified. | Rejected. |
| 2,513 | 2,455 | 58 | 5,530 | 5,418 | 112 | 3,004 | 2,983 | 21 | 17,073 | 16,636 | 437 | 8,094 | 8,001 | 93 |
| 4,577 | 4,442 | 135 | 5,389 | 5,249 | 140 | 1,406 | 1,330 | 76 | 10,795 | 10,482 | 313 | 674 | 666 | 8 |
| 5 | 5 | ... | 200 | 199 | 1 | 6 | 6 | .... | 872 | 868 | 4 | 49 | 49 | .... |
| 331 | 325 | 6 | 595 | 591 | 4 | 63 | 59 | 4 | 1,347 | 1,314 | 33 | 117 | 117 | .... |
| 8 | 8 | .... | 127 | 127 | .... | 18 | 18 | .... | 343 | 343 | .... | 11 | 11 | .... |
| 181 | 181 | .... | 437 | 436 | 1 | 89 | 89 | ... | 2,512 | 2,463 | 49 | 221 | 221 | .... |
| 12 | 12 | .... | 139 | 139 | ... | 30 | 30 | .... | 551 | 551 | .... | 67 | 67 | .... |
| 145 | 145 | ... | 66 | 66 | .... | 18 | 18 | .... | 337 | 335 | 2 | 57 | 56 | 1 |
| 7,772 | 7,573 | 199 | 12,483 | 12,225 | 258 | 4,634 | 4,533 | 101 | 33,830 | 32,992 | 838 | 9,290 | 9,188 | 102 |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX

Return showing the number of Dominion Weights and Lineal Measures of each Fiscal Year ended

| Inspection Division. | Dominion | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Avoir | | | | | | | | | | | | | |
| | 60 lbs. | 50 lbs. | 30 lbs. | 20 lbs. | 10 lbs. | 7 lbs. | 5 lbs. | 4 lbs. | 3 lbs. | 2 lbs. | 1 lb. | 8 ozs. | 4 ozs. | 2 ozs. |
| *Ontario.* | | | | | | | | | | | | | | |
| Belleville | .... | .... | .... | .... | 3 | 14 | 96 | 191 | 345 | 641 | 597 | 347 | 288 | 268 |
| Hamilton | .... | 2 | .... | .... | 2 | 3 | 181 | 96 | 1,833 | 2,747 | 2,671 | 522 | 351 | 344 |
| Ottawa | .... | .... | .... | .... | 16 | 18 | 105 | 102 | 325 | 478 | 474 | 288 | 236 | 203 |
| Toronto | .... | .... | .... | 4 | 19 | 9 | 162 | 201 | 613 | 1,157 | 1,191 | 560 | 498 | 451 |
| Windsor | .... | .... | .... | .... | 4 | 2 | 113 | 171 | 498 | 895 | 847 | 427 | 401 | 385 |
| Totals | .... | 2 | .... | 4 | 44 | 46 | 657 | 761 | 3,514 | 5,918 | 5,780 | 2,144 | 1,774 | 1,651 |
| *Quebec.* | | | | | | | | | | | | | | |
| Montreal | 364 | 30 | 21 | 3 | 38 | 36 | 589 | 672 | 990 | 2,624 | 2,395 | 1,440 | 1,317 | 1,162 |
| Quebec | 2 | 93 | 19 | 33 | 124 | 183 | 662 | 1,004 | 737 | 1,774 | 1,783 | 1,656 | 1,564 | 1,373 |
| St. Hyacinthe | .... | .... | .... | .... | 4 | 2 | 124 | 80 | 238 | 386 | 356 | 249 | 245 | 185 |
| Three Rivers | .... | .... | .... | .... | 10 | 4 | 161 | 150 | 310 | 426 | 404 | 343 | 299 | 147 |
| Totals | 366 | 123 | 40 | 36 | 176 | 225 | 1,536 | 1,906 | 2,275 | 5,210 | 4,938 | 3,688 | 3,425 | 2,867 |
| *New Brunswick.* | | | | | | | | | | | | | | |
| St. John | .... | .... | .... | .... | 3 | 4 | 44 | 60 | 79 | 287 | 228 | 131 | 98 | 93 |
| *Nova Scotia.* | | | | | | | | | | | | | | |
| Cape Breton | .... | 18 | 9 | 11 | 8 | .. | 16 | 36 | 112 | 96 | 80 | 19 | 13 | 4 |
| Halifax | .... | 4 | .... | .... | 1 | 16 | 50 | 102 | 117 | 377 | 355 | 230 | 159 | 118 |
| Pictou | .... | 14 | 2 | 4 | 5 | 7 | 28 | 43 | 76 | 186 | 156 | 69 | 65 | 56 |
| Totals | .... | 36 | 11 | 15 | 14 | 23 | 94 | 181 | 305 | 659 | 591 | 318 | 237 | 178 |
| *Prince Edward Island.* | | | | | | | | | | | | | | |
| Charlottetown | .... | .... | .... | .... | ... | 1 | 21 | 19 | 72 | 173 | 150 | 80 | 66 | 61 |
| *Manitoba.* | | | | | | | | | | | | | | |
| Winnipeg | .... | .... | .... | 2 | .... | 2 | 47 | 9 | 327 | 458 | 414 | 151 | 139 | 131 |
| *North-west Territories.* | | | | | | | | | | | | | | |
| Calgary | .... | .... | 1 | 1 | .... | 2 | 7 | 4 | 30 | 66 | 69 | 29 | 28 | 29 |
| *British Columbia.* | | | | | | | | | | | | | | |
| Victoria | 20 | .... | .... | .. | 2 | 5 | 4 | 41 | 41 | 190 | 149 | 64 | 45 | 41 |

C.

Denomination presented for Verification in each Inspection Division during the
June 30, 1903.

| WEIGHTS. | | | | | | | | | LINEAL MEASURES. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| dupois. | | | | | | | | | | | | | | | | | | | | |
| 1 oz. | 8 drs. | 4 drs. | 2 drs. | 1 dr. | ½ dr. | Total Number. | Troy Weights. | Miscellaneous Weights. | 6 feet. | 5 feet. | 1 yard. | ½ yard. | 2 feet. | 1 foot. | ½ foot. | 100 feet chains. | 66 feet chains. | Tape or Riband. | Total Number. | Miscellaneous Measures. |
| 210 | 90 | 30 | 11 | 6 | 2 | 3,139 | 6 | 7 | | | 600 | | | | | | | | 600 | |
| 330 | 235 | 103 | 17 | 11 | | 9,448 | | | | | 476 | | | | | | | | 476 | |
| 167 | 90 | 38 | 26 | 10 | 2 | 2,578 | | | | | 435 | | | | | | | | 435 | |
| 378 | 219 | 107 | 42 | 60 | | 5.671 | 13 | | | | 745 | | | | | | | | 745 | |
| 334 | 221 | 105 | 13 | 7 | | 4.423 | | | | | 257 | | | | | | | | 257 | |
| 1.419 | 855 | 383 | 109 | 94 | 4 | 25,259 | 19 | 7 | | | 2.513 | | | | | | | | 2.513 | |
| 865 | 341 | 86 | 53 | 74 | 1 | 13,101 | | 96 | | | 2,983 | | | | | | | | 2.983 | |
| 1,021 | 330 | 68 | 20 | 20 | 6 | 12,472 | | 545 | | | 1,247 | | | | | | | | 1.247 | |
| 132 | 56 | 14 | 5 | 1 | | 2,077 | | | | | 189 | | | | | | | | 189 | |
| 71 | 15 | 4 | 1 | 1 | | 2,346 | | | | | 158 | | | | | | | | 158 | |
| 2,089 | 742 | 172 | 79 | 96 | 7 | 29,996 | | 641 | | | 4,577 | | | | | | | | 4.577 | |
| 75 | 41 | 12 | | | | 1,155 | | 1 | | | 5 | | | | | | | | 5 | |
| 2 | 1 | | | | | 425 | | | | | 115 | | | | | | | | 115 | |
| 79 | 49 | 18 | 5 | 3 | | 1,683 | | 17 | | | 116 | | | | | | | | 116 | |
| 43 | 27 | 7 | 1 | | | 789 | | 13 | | | 100 | | | | | | | | 100 | |
| 124 | 77 | 25 | 6 | 3 | | 2,897 | | 30 | | | 331 | | | | | | | | 331 | |
| 44 | 19 | 8 | 2 | 3 | | 719 | | | | | 8 | | | | | | | | 8 | |
| 118 | 64 | 46 | 27 | 22 | 4 | 1,961 | | | | | 181 | | | | | | | | 181 | |
| 26 | 21 | 12 | 4 | 1 | | 330 | | | | | 141 | 4 | | | | | | | 145 | |
| 36 | 17 | 4 | | | | 659 | | | | | 12 | | | | | | | | 12 | |

## APPENDIX

RETURN showing the number of Dominion Weights and Lineal Measures of each Year ended

| Inspection Division. | Dominion | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Avoir | | | | | | | | | | | | | |
| | 60 lbs. | 50 lbs. | 30 lbs. | 20 lbs. | 10 lbs. | 7 lbs. | 5 lbs. | 4 lbs. | 3 lbs. | 2 lbs. | 1 lb. | 8 ozs. | 4 ozs. | 2 ozs. |
| *Ontario.* | | | | | | | | | | | | | | |
| Belleville | .... | .... | .... | .... | 3 | 14 | 96 | 191 | 345 | 641 | 597 | 347 | 288 | 268 |
| Hamilton | .... | 2 | .... | .... | 2 | 3 | 181 | 96 | 1,833 | 2,747 | 2,671 | 522 | 351 | 344 |
| Ottawa | .... | .... | .... | .... | 16 | 18 | 95 | 97 | 307 | 467 | 466 | 281 | 233 | 201 |
| Toronto | .... | .... | .... | 4 | 19 | 9 | 162 | 201 | 613 | 1,157 | 1,191 | 560 | 498 | 451 |
| Windsor | .... | .... | .... | .... | 4 | 2 | 113 | 171 | 498 | 895 | 847 | 427 | 401 | 385 |
| Totals | .... | 2 | ... | 4 | 44 | 46 | 647 | 756 | 3,596 | 5,907 | 5,772 | 2,137 | 1,771 | 1,649 |
| *Quebec.* | | | | | | | | | | | | | | |
| Montreal | 364 | 30 | 21 | 3 | 38 | 35 | 575 | 662 | 974 | 2,593 | 2,358 | 1,411 | 1,288 | 1,144 |
| Quebec | 2 | 79 | 19 | 26 | 90 | 151 | 561 | 812 | 612 | 1,476 | 1,477 | 1,368 | 1.306 | 1,206 |
| St. Hyacinthe | .... | .... | .... | .... | 4 | 2 | 124 | 79 | 238 | 386 | 356 | 248 | 245 | 185 |
| Three Rivers | .... | .... | .... | .... | 10 | 4 | 161 | 150 | 310 | 426 | 404 | 343 | 299 | 147 |
| Totals | 366 | 109 | 40 | 29 | 142 | 192 | 1,421 | 1,703 | 2,134 | 4,881 | 4,595 | 3,370 | 3,138 | 2,682 |
| *New Brunswick.* | | | | | | | | | | | | | | |
| St. John | .... | .... | .... | .... | 3 | 4 | 44 | 60 | 79 | 287 | 228 | 131 | 98 | 93 |
| *Nova Scotia.* | | | | | | | | | | | | | | |
| Cape Breton | .... | 17 | 9 | 11 | 8 | .... | 16 | 36 | 109 | 96 | 80 | 19 | 13 | 4 |
| Halifax | .... | 4 | .. | .... | 1 | 16 | 50 | 102 | 117 | 377 | 354 | 230 | 159 | 118 |
| Pictou | .... | 14 | 2 | 4 | 5 | 7 | 28 | 43 | 76 | 186 | 156 | 69 | 65 | 56 |
| Totals | ... | 35 | 11 | 15 | 14 | 23 | 94 | 181 | 302 | 659 | 590 | 318 | 237 | 178 |
| *Prince Edward Island.* | | | | | | | | | | | | | | |
| Charlottetown | .... | .. | .... | .... | .... | 1 | 21 | 19 | 72 | 173 | 150 | 80 | 66 | 61 |
| *Manitoba.* | | | | | | | | | | | | | | |
| Winnipeg | ... | .... | .... | 2 | .... | 2 | 47 | 9 | 327 | 458 | 414 | 151 | 139 | 131 |
| *North-west Territories.* | | | | | | | | | | | | | | |
| Calgary | .... | .... | 1 | 1 | .... | 2 | 7 | 4 | 30 | 66 | 69 | 29 | 28 | 29 |
| *British Columbia.* | | | | | | | | | | | | | | |
| Victoria | 40 | ... | .... | .... | 2 | 5 | 4 | 41 | 41 | 160 | 149 | 64 | 45 | 41 |

C—*Continued.*

Denomination Inspected and Verified in each Inspection Division during the Fiscal June 30, 1903.

| Weights. | | | | | | | Troy Weights. | Miscellaneous Weights. | Lineal Measures. | | | | | | | | | | | Miscellaneous Measures. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| dupois. | | | | | | | | | | | | | | | | | | | | |
| 1 oz. | 8 drs. | 4 drs. | 2 drs. | 1 dr. | ½ dr. | Total Number. | | | 6 feet. | 5 feet. | 1 yard | ½ yard. | 2 feet. | 1 foot. | ½ foot. | 100 feet chains. | 66 feet chains. | Tape or Riband. | Total Number. | |
| 210 | 90 | 30 | 11 | 6 | 2 | 3,139 | 6 | 7 | .... | .... | 609 | .... | .... | .... | .... | .... | .... | .... | 600 | .... |
| 330 | 235 | 103 | 17 | 11 | .... | 9,448 | .... | .... | .... | .... | 424 | .... | .... | .... | .... | .... | .... | .... | 424 | .... |
| 163 | 90 | 38 | 26 | 10 | 2 | 2,510 | .... | .... | .... | .... | 429 | .... | .... | .... | .... | .... | .... | .... | 429 | .... |
| 378 | 219 | 107 | 42 | 60 | .... | 5,671 | .... | .... | .... | .... | 745 | .... | .... | .... | .... | .... | .... | .... | 745 | .... |
| 334 | 221 | 105 | 13 | 7 | .... | 4,423 | .... | .... | .... | .... | 257 | .... | .... | .... | .... | .... | .... | .... | 257 | .... |
| 1,415 | 855 | 383 | 109 | 94 | 4 | 25,191 | 6 | 7 | .... | .... | 2,455 | .... | .... | .... | .... | .... | .... | .... | 2,455 | .... |
| 846 | 336 | 85 | 53 | 74 | 1 | 12,891 | .... | 96 | .... | .... | 2,981 | .... | .... | .... | .... | .... | .... | .... | 2,981 | .... |
| 944 | 323 | 67 | 20 | 20 | 6 | 10,565 | .... | 503 | .... | .... | 1,117 | .... | .... | .... | .... | .... | .... | .... | 1,117 | .... |
| 132 | 56 | 14 | 5 | 1 | .... | 2,075 | .... | .... | .... | .... | 186 | .... | .... | .... | .... | .... | .... | .... | 186 | .... |
| 71 | 15 | 4 | 1 | 1 | .... | 2,346 | .... | .... | .... | .... | 158 | .... | .... | .... | .... | .... | .... | .... | 158 | .... |
| 1,993 | 730 | 170 | 79 | .96 | 7 | 27,877 | .... | 599 | .... | .... | 4,442 | .... | .... | .... | .... | .... | .... | .... | 4,442 | .... |
| 75 | 41 | 12 | .... | .... | .... | 1,115 | .... | 1 | .... | .... | 5 | .... | .... | .... | .... | .... | .... | .... | 5 | .... |
| 2 | 1 | .... | .... | .... | .... | 421 | .... | .... | .... | .... | 109 | .... | .... | .... | .... | .... | .... | .... | 109 | .... |
| 79 | 49 | 18 | 5 | 3 | .... | 1,682 | .... | 17 | .... | .... | 116 | .... | .... | .... | .... | .... | .... | .... | 116 | .... |
| 43 | 27 | 7 | 1 | .... | .... | 789 | .... | 13 | .... | .... | 100 | .... | .... | .... | .... | .... | .... | .... | 100 | .... |
| 124 | 77 | 25 | 6 | 3 | .... | 2,892 | .... | 30 | .... | .... | 325 | .... | .... | .... | .... | .... | .... | .... | 325 | .... |
| 44 | 19 | 8 | 2 | 3 | .... | 719 | .... | .... | .... | .... | 8 | .... | .... | .... | .... | .... | .... | .... | 8 | .... |
| 118 | 64 | 46 | 27 | 22 | 4 | 1,961 | .... | .... | .... | .... | 181 | .... | .... | .... | .... | .... | .... | .... | 181 | .... |
| 26 | 21 | 12 | 4 | 1 | .... | 330 | .... | .... | .... | .... | 141 | 4 | .... | .... | .... | .... | .... | .... | 145 | .... |
| 36 | 17 | 4 | .... | .... | .... | 659 | .... | .... | .... | .... | 12 | .... | .... | .... | .... | .... | .... | .... | 12 | .... |

## APPENDIX

RETURN showing the number of Dominion Weights and Lineal Measures of each
June 30,

| INSPECTION DIVISIONS. | DOMINION | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Avoir | | | | | | | | | | | | | |
| | 60 lbs. | 50 lbs. | 30 lbs. | 20 lbs. | 10 lbs. | 7 lbs. | 5 lbs. | 4 lbs. | 3 lbs. | 2 lbs. | 1 lb. | 8 ozs. | 4 ozs. | 2 ozs. |
| *Ontario.* | | | | | | | | | | | | | | |
| Hamilton | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Ottawa | .... | .... | .... | .... | .... | .... | 10 | 5 | 18 | 11 | 8 | 7 | 3 | 2 |
| Toronto | .... | .... | .... | .... | .... | .. | .... | .... | .... | .... | .... | .... | .... | .... |
| Totals | .... | .... | .... | .... | .... | .... | 10 | 5 | 18 | 11 | 8 | 7 | 3 | 2 |
| *Quebec.* | | | | | | | | | | | | | | |
| Montreal | .. | .... | .... | .... | .. | 1 | 14 | 10 | 16 | 31 | 37 | 29 | 29 | 18 |
| Quebec | .... | 14 | .... | 7 | 34 | 32 | 101 | 192 | 125 | 298 | 306 | 288 | 258 | 167 |
| St. Hyacinthe | .... | .... | .... | .... | .... | .... | .... | 1 | .... | .... | .... | 1 | .... | .... |
| Totals | .... | 14 | .... | 7 | 34 | 33 | 115 | 203 | 141 | 329 | 343 | 318 | 287 | 185 |
| *Nova Scotia.* | | | | | | | | | | | | | | |
| Cape Breton | .... | 1 | .... | .... | .... | .... | .... | .... | 3 | .... | .... | .... | .... | .... |
| Halifax | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1 | .... | .... | .... | .... |
| Totals | .... | 1 | .... | .... | .... | .... | .... | .... | 3 | 1 | .... | .... | .... | .... |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

C—*Concluded.*

Denomination, Rejected in each Inspection Division during the Fiscal Year ended 1903.

| Weights. | | | | | | | | | Lineal Measures. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| dupois. | | | | | | | | | | | | | | | | | | | | |
| 1 oz. | 8 drs. | 4 drs. | 2 drs. | 1 dr. | ½ dr. | Total Number. | Troy Weights. | Miscellaneous Weights. | 6 feet. | 5 feet. | 1 yard. | ½ yard. | 2 feet. | 1 foot. | ½ foot. | 100 feet chains. | 66 feet chains. | Tape or Riband. | Total Number. | Miscellaneous Measures. |
| | | | | | | | | | | | 52 | | | | | | | | 52 | |
| 4 | | | | | | 68 | | | | | 6 | | | | | | | | 6 | |
| | | | | | | | 13 | | | | | | | | | | | | | |
| 4 | | | | | | 68 | 13 | | | | 58 | | | | | | | | 58 | |
| 19 | 5 | 1 | | | | 210 | | | | | 2 | | | | | | | | 2 | |
| 77 | 7 | 1 | | | | 1,907 | | 42 | | | 130 | | | | | | | | 130 | |
| | | | | | | 2 | | | | | 3 | | | | | | | | 3 | |
| 86 | 12 | 2 | | | | 2,119 | | 42 | | | 135 | | | | | | | | 135 | |
| | | | | | | 4 | | | | | 6 | | | | | | | | 6 | |
| | | | | | | 1 | | | | | | | | | | | | | | |
| | | | | | | 5 | | | | | 6 | | | | | | | | 6 | |

W. J. GERALD,
*Deputy Minister.*

## APPENDIX

RETURN showing the Number of Dominion Measures of Capacity, Balances and Weighing during the Fiscal Year

| Inspection Divisions. | Measures of Capacity. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dominion. | | | | | | | | | | | | |
| | Bushel. | ½ Bushel. | Peck. | Gallon. | ½ Gallon. | Quart. | Pint. | ½ Pint. | Gill. | ½ Gill. | Total Number. | Miscellaneous. | 5 lbs. and under. |
| *Ontario.* | | | | | | | | | | | | | |
| Belleville | 245 | 1,565 | 1,281 | 1,558 | 1,438 | 1,845 | 1,373 | 177 | 1 | .... | 9,483 | 14 | 215 |
| Hamilton | 41 | 73 | 203 | 621 | 1,025 | 1,798 | 1,230 | 220 | 1 | .... | 5,212 | 31 | 1,155 |
| Ottawa | ..... | 11 | 36 | 358 | 475 | 714 | 405 | 109 | 14 | 1 | 2,123 | 11 | 155 |
| Toronto | 252 | 218 | 422 | 1,836 | 2,589 | 3,785 | 5,083 | 993 | 12 | .... | 15,190 | 361 | 444 |
| Windsor | 1,234 | 1,266 | 1,266 | 2,473 | 2,557 | 3,720 | 5,744 | 1,569 | 156 | .... | 19,985 | .. | 290 |
| Totals | 1,772 | 3,133 | 3,208 | 6,846 | 8,084 | 11,862 | 13,835 | 3,068 | 184 | 1 | 51,993 | 417 | 2,259 |
| *Quebec.* | | | | | | | | | | | | | |
| Montreal | 1 | 1,528 | 1,637 | 3,748 | 4,171 | 6,249 | 7,011 | 2,504 | 481 | 7 | 27,337 | 360 | 1,070 |
| Quebec | 2 | 324 | 392 | 1,419 | 2,022 | 2,148 | 1,954 | 843 | 208 | 10 | 9,322 | 62 | 239 |
| St. Hyacinthe | ..... | 47 | 80 | 338 | 599 | 699 | 408 | 182 | 56 | ... | 2,379 | 40 | 96 |
| Three Rivers | ... | 77 | 41 | 230 | 445 | 421 | 261 | 142 | 17 | .... | 1,634 | 21 | 154 |
| Totals | 3 | 1,976 | 2,150 | 5,735 | 7,237 | 9,487 | 9,634 | 3,671 | 762 | 17 | 40,672 | 483 | 1,559 |
| *New Brunswick.* | | | | | | | | | | | | | |
| St. John | ..... | 216 | 100 | 739 | 959 | 1,063 | 423 | 72 | 11 | 1 | 3,584 | 35 | 54 |
| *Nova Scotia.* | | | | | | | | | | | | | |
| Cape Breton | ..... | ... | 1 | 73 | 153 | 119 | 30 | 5 | .... | .... | 381 | 3 | 28 |
| Halifax | .... | 33 | 24 | 182 | 360 | 313 | 202 | 42 | 18 | 13 | 1,187 | 45 | 91 |
| Pictou | 1 | 29 | 35 | 203 | 387 | 364 | 197 | 55 | 2 | .... | 1,273 | 29 | 38 |
| Totals | 1 | 62 | 60 | 458 | 900 | 796 | 429 | 102 | 20 | 13 | 2,841 | 77 | 157 |
| *P. E. Island.* | | | | | | | | | | | | | |
| Charlottetown | ..... | ... | .... | 21 | 46 | 204 | 95 | 19 | .. | ... | 385 | 5 | 33 |
| *Manitoba.* | | | | | | | | | | | | | |
| Winnipeg | 26 | 4 | 30 | 457 | 586 | 458 | 301 | 56 | 2 | .. | 1,920 | 69 | 127 |
| *N. W. Territories.* | | | | | | | | | | | | | |
| Calgary | 2 | 2 | 3 | 68 | 104 | 80 | 59 | 16 | .... | ... | 334 | 11 | 32 |
| *British Columbia.* | | | | | | | | | | | | | |
| Victoria | ..... | .... | 1 | 51 | 77 | 131 | 101 | 1 | ... | .. | 362 | 8 | 63 |

# D.

Machines of each Denomination presented for Verification, in each Inspection Division, ended June 30, 1903.

BALANCES.

| With Equal Arms. | | | Steelyards with Divided Arms. | | | | Weigh Bridges or Platform Scales. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 lbs. to 50 lbs. | 51 lbs. to 100 lbs. | 101 lbs. and upwards. | 500 lbs. and under. | 501 lbs. to 1,000 lbs. | 1,001 lbs. to 2,000 lbs. | 2,001 lbs. and upwards. | 250 lbs. and under. | 251 lbs. to 500 lbs. | 501 lbs. to 2,000 lbs. | 2,001 lbs. to 4,000 lbs. | 4,001 lbs. to 6,000 lbs. | 6,001 lbs. and upwards. | Totals. | Miscellaneous Balances. |
| 375 | .... | .... | 138 | 2 | 2 | .... | 585 | 179 | 604 | 165 | 67 | 203 | 2,535 | 87 |
| 1,313 | .... | .... | 2,181 | 32 | 2 | .... | 3,578 | 134 | 2,041 | 278 | 110 | 222 | 11,046 | 805 |
| 328 | 1 | .... | 6 | .... | .... | .... | 673 | 314 | 538 | 44 | 39 | 87 | 2,185 | 6,421 |
| 705 | .... | .... | 374 | 14 | 5 | 3 | 905 | 113 | 1,087 | 276 | 75 | 353 | 4,354 | 740 |
| 548 | .... | .... | 239 | 4 | 2 | .... | 1.273 | 106 | 2.283 | 252 | 75 | 414 | 5.486 | 41 |
| 3,269 | 1 | .... | 2,938 | 52 | 11 | 3 | 7.014 | 846 | 6,553 | 1,015 | 366 | 1,279 | 25,606 | 8,094 |
| 1.773 | 2 | 7 | 973 | 27 | 7 | 19 | 2,309 | 1,082 | 2.228 | 204 | 176 | 285 | 10,162 | 485 |
| 1.431 | 4 | 119 | 255 | 3 | .... | .... | 767 | 835 | 595 | 63 | 28 | 56 | 4.395 | 151 |
| 245 | .... | 1 | 94 | .... | .... | 1 | 370 | 281 | 418 | 15 | 53 | 62 | 1,636 | 31 |
| 248 | .... | .... | 27 | .... | .... | .... | 279 | 436 | 216 | 5 | 18 | 14 | 1.397 | 7 |
| 3,697 | 6 | 127 | 1,349 | 30 | 7 | 20 | 3.725 | 2,634 | 3.457 | 287 | 275 | 417 | 17.590 | 674 |
| 146 | .... | .... | 6 | .... | .... | . | 381 | 206 | 218 | 18 | 12 | 37 | 1,078 | 49 |
| 56 | .... | 7 | 14 | 3 | .... | .... | 165 | 38 | 36 | 4 | 1 | 50 | 402 | 18 |
| 242 | 12 | 3 | 25 | .... | 2 | 1 | 316 | 57 | 125 | 20 | 6 | 57 | 957 | 75 |
| 112 | ... | 6 | 18 | .... | .... | .... | 179 | 76 | 115 | 18 | 24 | 60 | 646 | 24 |
| 410 | 12 | 16 | 57 | 3 | 2 | 1 | 660 | 171 | 276 | 42 | 31 | 167 | 2.005 | 117 |
| 94 | ... | .... | 17 | .... | .... | 1 | 113 | 42 | 139 | 15 | 15 | 19 | 488 | 11 |
| 310 | .... | .... | 86 | 3 | .... | .... | 533 | 37 | 599 | 401 | 578 | 364 | 3,038 | 221 |
| 33 | 1 | .... | 15 | .... | 2 | 1 | 106 | 7 | 140 | 18 | 17 | 49 | 421 | 57 |
| 76 | .... | .... | 21 | 1 | 8 | .... | 265 | 15 | 221 | 8 | 5 | 37 | 720 | 67 |

## APPENDIX

RETURN showing the Number of Dominion Measures of Capacity, Balances and Weighing during the Fiscal Year

| Inspection Division. | Measures of Capacity. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dominion. | | | | | | | | | | | | |
| | Bushel. | ½ Bushel. | Peck. | Gallon. | ½ Gallon. | Quart. | Pint. | ½ Pint. | Gill. | ½ Gill. | Total Number. | Miscellaneous. | 5 lbs. and under. |
| *Ontario.* | | | | | | | | | | | | | |
| Belleville | 245 | 1,565 | 1,281 | 1,558 | 1,438 | 1,845 | 1,373 | 177 | 1 | .... | 9,483 | 14 | 215 |
| Hamilton | 41 | 73 | 203 | 621 | 1,025 | 1,797 | 1,229 | 220 | 1 | ... | 5,210 | 31 | 1,144 |
| Ottawa | ..... | 10 | 32 | 341 | 460 | 703 | 403 | 109 | 14 | 1 | 2,073 | 11 | 137 |
| Toronto | 252 | 218 | 422 | 1,836 | 2,589 | 3,785 | 5,083 | 993 | 12 | .. | 15,190 | 361 | 444 |
| Windsor | 1,234 | 1,266 | 1,256 | 2,473 | 2,557 | 3,720 | 5,744 | 1,569 | 156 | .... | 19,985 | ... | 289 |
| Totals | 1,772 | 3,132 | 3,204 | 6,829 | 8,069 | 11,850 | 13,832 | 3,068 | 184 | 1 | 51,941 | 417 | 2,229 |
| *Quebec.* | | | | | | | | | | | | | |
| Montreal | 1 | 1,526 | 1,637 | 3,748 | 4,171 | 6,249 | 7,011 | 2,504 | 481 | 7 | 27,335 | 359 | 1,066 |
| Quebec | 2 | 321 | 389 | 1,415 | 2,020 | 2,147 | 1,954 | 842 | 208 | 10 | 9,308 | 61 | 224 |
| Three Rivers | ..... | 75 | 41 | 230 | 445 | 421 | 261 | 142 | 17 | .... | 1,632 | 21 | 154 |
| St. Hyacinthe | ...... | 47 | 80 | 338 | 599 | 669 | 408 | 182 | 56 | .... | 2,379 | 40 | 92 |
| Totals | 3 | 1,969 | 2,147 | 5,731 | 7,235 | 9,486 | 9,634 | 3,670 | 762 | 17 | 40,654 | 481 | 1,536 |
| *New Brunswick.* | | | | | | | | | | | | | |
| St. John | ...... | 216 | 100 | 739 | 959 | 1,063 | 423 | 72 | 11 | 1 | 3,584 | 35 | 54 |
| *Nova Scotia.* | | | | | | | | | | | | | |
| Cape Breton | ..... | ..... | 1 | 73 | 153 | 119 | 30 | 4 | .... | ... | 380 | 3 | 27 |
| Halifax | .... | 33 | 24 | 181 | 360 | 313 | 202 | 42 | 18 | 13 | 1,186 | 44 | 90 |
| Pictou | 1 | 29 | 35 | 203 | 387 | 364 | 197 | 55 | 2 | . . | 1,273 | 29 | 38 |
| Totals | 1 | 62 | 60 | 457 | 900 | 796 | 429 | 101 | 20 | 13 | 2,839 | 76 | 155 |
| *P. E. Island.* | | | | | | | | | | | | | |
| Charlottetown | .. .. | ...... | ..... | 21 | 46 | 204 | 95 | 19 | .... | .... | 385 | 5 | 33 |
| *Manitoba.* | | | | | | | | | | | | | |
| Winnipeg | 26 | 4 | 30 | 457 | 586 | 458 | 301 | 56 | 2 | .. . | 1,920 | 69 | 127 |
| *N. W. Territories.* | | | | | | | | | | | | | |
| Calgary | 2 | 2 | 3 | 68 | 104 | 80 | 59 | 16 | .... | ... | 334 | 11 | 32 |
| *British Columbia.* | | | | | | | | | | | | | |
| Victoria | ...... | .... | 1 | 51 | 77 | 131 | 101 | 1 | .... | .... | 362 | 8 | 63 |

D—*Continued.*

Machines of each Denomination, Inspected and Verified, in each Inspection Division' ended June 30, 1903.

BALANCES.

| With Equal Arms. | | | Steel Yards with Divided Arms. | | | | Weigh Bridges or Platform Scales. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 lbs. to 50 lbs. | 51 lbs. to 100 lbs. | 101 lbs. and upwards. | 500 lbs. and under. | 501 lbs. to 1,000 lbs. | 1,001 lbs. to 2,000 lbs. | 2,001 lbs. and upwards. | 250 lbs. and under. | 251 to 500 lbs. | 501 lbs. to 2,000 lbs. | 2,001 lbs. to 4,000 lbs. | 4,001 to 6,000 lbs. | 6,001 lbs. and upwards. | Total. | Miscellaneous Balances. |
| 376 | .... | .... | 138 | 2 | 2 | .... | 585 | 179 | 604 | 165 | 67 | 203 | 2,535 | 87 |
| 1,251 | | .... | 2,164 | 31 | 2 | .... | 3,478 | 120 | 1,906 | 249 | 104 | 190 | 10,639 | 801 |
| 311 | .... | .... | 5 | .... | .... | .... | 648 | 302 | 509 | 41 | 38 | 81 | 2,073 | 6,332 |
| 705 | .... | . | 374 | 14 | 5 | 3 | 905 | 113 | 1,087 | 276 | 75 | 353 | 4,354 | 740 |
| 545 | .... | .... | 237 | 4 | 2 | .... | 1,262 | 105 | 2,267 | 245 | 74 | 405 | 5,435 | 41 |
| 3,188 | .... | .... | 2,918 | 51 | 11 | 3 | 6,878 | 819 | 6,373 | 976 | 358 | 1,232 | 25,036 | 8,001 |
| 1,735 | 2 | 7 | 920 | 26 | 7 | 19 | 2,292 | 1,045 | 2,177 | 199 | 158 | 274 | 9,927 | 477 |
| 1,377 | 3 | 119 | 246 | 2 | .... | .... | 749 | 776 | 556 | 51 | 27 | 55 | 4,185 | 151 |
| 248 | .. | .... | 27 | .... | .... | .... | 279 | 436 | 216 | 5 | 18 | 14 | 1,397 | 7 |
| 221 | .... | 1 | 82 | .... | .... | 1 | 360 | 272 | 398 | 13 | 52 | 60 | 1,552 | 31 |
| 3,581 | 5 | 127 | 1,275 | 28 | 7 | 20 | 3,680 | 2,529 | 3,347 | 268 | 255 | 403 | 17,061 | 666 |
| 145 | .. | .... | 6 | .... | .... | .... | 380 | 206 | 216 | 18 | 12 | 36 | 1,073 | 49 |
| 56 | .... | 7 | 11 | 3 | .... | .... | 165 | 37 | 35 | 4 | 1 | 50 | 396 | 18 |
| 240 | 12 | 3 | 24 | .... | 2 | 1 | 314 | 56 | 120 | 16 | 6 | 47 | 931 | 75 |
| 112 | .... | 6 | 18 | .... | .... | .... | 179 | 75 | 111 | 17 | 22 | 59 | 637 | 24 |
| 408 | 12 | 16 | 53 | 3 | 2 | 1 | 658 | 168 | 266 | 37 | 29 | 156 | 1,964 | 117 |
| 94 | .... | .... | 17 | .... | .. | 1 | 113 | 42 | 139 | 15 | 15 | 19 | 488 | 11 |
| 309 | .... | .... | 86 | 3 | . | .... | 531 | 37 | 587 | 395 | 561 | 352 | 2,988 | 221 |
| 33 | 1 | .... | 15 | . | 2 | 1 | 105 | 7 | 139 | 18 | 17 | 49 | 419 | 56 |
| 76 | .... | .... | 21 | 1 | 8 | . | 265 | 15 | 221 | 8 | 5 | 37 | 720 | 67 |

## APPENDIX

RETURN showing the number of Dominion Measures of Capacity, Balances and during the Fiscal Year

| Inspection Divisions. | Measures of Capacity. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dominion. | | | | | | | | | | | | |
| | Bushel. | ½ Bushel. | Peck. | Gallon. | ½ Gallon. | Quart. | Pint. | ½ Pint. | Gill. | ½ Gill. | Total Number. | Miscellaneous. | 5 lbs. and under. |
| *Ontario.* | | | | | | | | | | | | | |
| Hamilton | .... | .... | .... | .... | .... | 1 | 1 | .... | .... | .... | 2 | .... | 11 |
| Ottawa | .... | 1 | 4 | 17 | 15 | 11 | 2 | .... | .... | .... | 50 | .... | 18 |
| Windsor | .... | .... | .... | | .... | .... | .... | .... | .... | .... | .... | .... | 1 |
| Totals | .... | 1 | 4 | 17 | 15 | 12 | 3 | .... | .... | .... | 52 | .... | 30 |
| *Quebec.* | | | | | | | | | | | | | |
| Montreal | .... | 2 | .... | .... | .... | .... | .... | .... | .... | .... | 2 | 1 | 4 |
| Quebec | .... | 3 | 3 | 4 | 2 | 1 | .... | 1 | .... | .... | 14 | 1 | 15 |
| Three Rivers | .... | 2 | .... | .... | .... | .... | .... | .... | .... | .... | 2 | .... | .... |
| St. Hyacinthe | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 4 |
| Totals | .... | 7 | 3 | 4 | 2 | 1 | .... | 1 | .... | .... | 18 | 2 | 23 |
| *New Brunswick.* | | | | | | | | | | | | | |
| St. John | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| *Nova Scotia.* | | | | | | | | | | | | | |
| Cape Breton | .... | .... | .... | .... | .... | .... | .... | 1 | .... | .... | 1 | .... | 1 |
| Halifax | .... | .... | .... | 1 | .... | .... | .... | .... | .... | .... | 1 | 1 | 1 |
| Pictou | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Totals | .... | .... | .... | 1 | .... | .... | .... | 1 | .... | .... | 2 | 1 | 2 |
| *Manitoba.* | | | | | | | | | | | | | |
| Winnipeg | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| *N. W. Territories.* | | | | | | | | | | | | | |
| Calgary | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

D—*Continued.*

Weighing Machines of each Denomination Rejected in each Inspection Division, ended June 30, 1903.

BALANCES.

| With Equal Arms. | | | Steel Yards with Divided Arms. | | | | Weigh Bridges or Platform Scales. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 lbs. to 50 lbs. | 51 lbs. to 100 lbs. | 101 lbs. and upwards. | 500 lbs. and under. | 501 lbs. to 1,000 lbs. | 1,001 lbs. to 2,000 lbs. | 2,001 lbs. and upwards. | 250 lbs. and under. | 251 lbs. to 500 lbs. | 501 lbs. to 2,000 lbs. | 2,001 lbs. to 4,000 lbs. | 4,001 lbs. to 6,000 lbs. | 6,001 lbs. and upwards. | Totals. | Miscellaneous. |
| 62 | .... | .... | 17 | 1 | .... | .... | 100 | 14 | 135 | 29 | 6 | 32 | 407 | 4 |
| 1 | .... | .... | 1 | .... | .... | .... | 25 | 12 | 29 | 3 | 1 | 6 | 96 | 89 |
| 3 | .... | .... | 2 | .... | .... | .... | 11 | 1 | 16 | 7 | 1 | 9 | 51 | .... |
| 66 | .... | .... | 20 | 1 | .... | .... | 136 | 27 | 180 | 39 | 8 | 47 | 554 | 93 |
| 38 | .... | .... | 53 | 1 | .... | .... | 17 | 37 | 51 | 5 | 18 | 11 | 235 | 8 |
| 54 | 1 | .... | 9 | 1 | .... | .... | 18 | 59 | 39 | 12 | 1 | 1 | 210 | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 24 | .... | .... | 12 | .... | .... | .... | 10 | 9 | 20 | 2 | 1 | 2 | 84 | .... |
| 116 | 1 | .... | 74 | 2 | .... | .... | 45 | 105 | 110 | 19 | 20 | 14 | 529 | 8 |
| 1 | .... | .... | .... | .... | .... | .... | 1 | .... | 2 | .... | .... | 1 | 5 | .... |
| .... | .... | .... | 3 | .... | .... | .... | .... | 1 | 1 | .... | .... | .... | 6 | .... |
| 2 | .... | .... | .... | .... | .... | 1 | 2 | 1 | 5 | 4 | .... | 10 | 26 | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 1 | 4 | 1 | 2 | 1 | 9 | .... |
| 2 | .... | .... | 3 | .... | .... | 1 | 2 | 3 | 10 | 5 | 2 | 11 | 41 | .... |
| 1 | .... | .... | .... | .... | .... | .... | 2 | .... | 12 | 6 | 17 | 12 | 50 | .... |
| .... | .... | .... | .... | .... | .... | .... | 1 | .... | 1 | .... | .... | .... | 2 | .... |

W. J. GERALD,
*Deputy Minister.*

# APPENDIX E.

STATEMENT of Gas Expenditures and Receipts for the Year ended June 30, 1903.

| Districts. | Inspectors. | Expenditures. | | | | | | Receipts. |
|---|---|---|---|---|---|---|---|---|
| | | Salaries. | Special Assistance. | Rent. | Travelling Expenses. | Sundries. | Total. | |
| | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Barrie | Shanacy, M | 100 00 | .... | .... | .... | .... | 100 00 | 125 00 |
| Belleville | Johnson, Wm.<br>Stuart, W. E. | 449 96 | .... | 231 25 | 7 70 | 35 55 | 724 46 | 87 75 |
| Berlin | Broadfoot, S. | 100 00 | .... | .... | 53 15 | 13 91 | 167 06 | 302 00 |
| Brockville | Johnston, C. W. (temporary) | .... | 99 96 | .... | .... | 14 95 | 114 91 | 206 75 |
| Cobourg | Bickle, J. W | 100 00 | .... | .... | 33 30 | 31 15 | 164 45 | 191 50 |
| Cornwall | Mulhern, M. M. | 100 00 | .... | .... | .... | 46 80 | 146 80 | 63 25 |
| Guelph | Broadfoot, S. | 200 00 | .... | .... | .... | 13 64 | 213 64 | 175 00 |
| Hamilton | McPhie, D.<br>McPhie, W. H.<br>Dennis, W. N. | 2,499 96 | .... | 36 00 | 130 05 | 64 69 | 2,730 70 | 2,322 50 |
| Kingston | Behan, J. J. | 400 00 | .... | 45 00 | .... | 51 55 | 496 55 | 355 50 |
| Listowel | Male, Thos | 100 00 | .... | 60 00 | .... | 15 10 | 175 10 | 60 75 |
| London | Nash, A. F. | 1,100 00 | 95 00 | .... | 284 30 | 136 93 | 1,616 23 | 2,488 50 |
| Napanee | Johnson, Wm. (acting) | .... | .... | .... | 31 15 | 4 55 | 35 70 | 67 00 |
| Ottawa | Roche, H. G. | 1,050 00 | 540 00 | 300 00 | 7 50 | 83 35 | 1,980 85 | 634 50 |
| Owen Sound | Graham, W. J | 200 00 | .... | 125 00 | .... | .... | 325 00 | 115 25 |
| Peterborough | Rork, Thos. | 150 00 | .... | .... | .... | 2 00 | 152 00 | 107 50 |
| Sarnia | Hicks, W. H. | 100 00 | .... | 20 00 | .... | 1 25 | 121 25 | 224 75 |
| Stratford | Rennie, Geo. | 200 00 | .... | .... | .... | 14 85 | 214 85 | 146 50 |
| Toronto | Johnstone, J. K.<br>Pape, J<br>Whyte, J. A. | 3,349 88 | .... | .... | .... | 57 98 | 3,407 86 | 7,530 50 |
| | Ontario | 10,199 80 | 734 96 | 817 25 | 547 15 | 588 25 | 12,887 41 | 15,204 50 |
| Montreal | Aubin, A.<br>O'Flaherty, M. J. | 2,299 92 | 356 00 | 240 00 | 81 40 | 140 20 | 3,117 52 | 7,018 80 |
| Quebec | LeVasseur, N.<br>Moreau, A. | 1,300 00 | .... | 150 00 | .... | 7 40 | 1,457 46 | 361 25 |
| Sherbrooke | Simpson, A. F. | 150 00 | .... | .... | .... | .... | 150 00 | 36 00 |
| St. Hyacinthe | Benoit, L. V. | 100 00 | .... | .... | .... | .... | 100 00 | 53 50 |
| | Quebec | 3,849 92 | 356 00 | 390 00 | 81 40 | 147 66 | 4,824 98 | 7,469 55 |
| Fredericton | Fowler, Jas. D | 200 00 | .... | .... | .... | .... | 200 00 | 68 75 |
| St. John | Wilson, J. E. | 1,100 00 | .... | .... | 77 16 | 7 53 | 1,184 69 | 457 25 |
| | New Brunswick | 1,300 00 | .... | .... | 77 16 | 7 53 | 1,384 69 | 526 00 |
| Halifax, N.S. | Miller, A.<br>Munro, H. D.<br>Ritchie, A. J. | 1,899 96 | .... | 307 35 | 342 33 | 106 07 | 2,655 71 | 758 00 |
| Charlottetown, P.E.I. | Bell, J. H. | 300 00 | .... | .... | .... | 19 82 | 319 82 | 77 50 |
| Winnipeg, Man. | Magness, R. | 300 00 | .... | 75 00 | .... | 56 70 | 431 70 | 553 75 |
| Nanaimo | McAloney, J. A. | 100 00 | .... | .... | .... | .... | 100 00 | 65 00 |
| New Westminster. | Wolfenden, Wm. | 100 00 | .... | .... | .... | 23 85 | 123 85 | 185 25 |
| Vancouver | Miller, J. E. | 300 00 | .... | .... | 74 25 | 57 60 | 431 85 | 145 75 |
| Victoria | Jones, R. | 200 00 | .... | .... | .... | 10 00 | 210 00 | 174 50 |
| | British Columbia | 700 00 | .... | .... | 74 25 | 91 45 | 865 70 | 570 50 |

## APPENDIX E—*Concluded.*

STATEMENT of Gas Expenditures and Receipts for the Year ended June 30, 1903.

### RECAPITULATION.

| Provinces. | Expenditures. | | | | | | Receipts. |
|---|---|---|---|---|---|---|---|
| | Salaries. | Special Assistance. | Rent. | Travelling Expenses. | Sundries. | Totals. | |
| | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Ontario | 10,199 80 | 734 96 | 817 25 | 547 15 | 588 25 | 12,887 41 | 15,204 50 |
| Quebec | 3,849 92 | 356 00 | 390 00 | 81 40 | 147 66 | 4,824 98 | 7,469 55 |
| New Brunswick | 1,300 00 | | | 77 16 | 7 53 | 1,384 69 | 526 00 |
| Nova Scotia | 1,899 96 | | 307 35 | 342 33 | 106 07 | 2,655 71 | 758 00 |
| Prince Edward Island | 300 00 | | | | 19 82 | 319 82 | 77 50 |
| Manitoba | 300 00 | | 75 00 | | 56 70 | 431 70 | 553 75 |
| British Columbia | 700 00 | | | 74 25 | 91 45 | 865 70 | 570 50 |
| General | | | | 28 25 | 874 45 | 902 70 | |
| General expenses | | | | | 497 95 | 497 95 | |
| Printing | | | | | 584 78 | 584 78 | |
| Stationery | | | | | 211 24 | 211 24 | |
| Totals | 18,549 68 | 1,090 96 | 1,589 60 | 1,150 54 | 3,185 90 | 25,566 68 | 25,159 80 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. | | | | | SULPHUR PER 100 ALLOWANCE, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below Standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Barrie— | | | | | | | | |
| July | ... | ... | 20·24 | 0 | 1 | ... | ... | ... |
| August | ... | ... | 18·51 | 0 | 1 | ... | ... | ... |
| September | ... | ... | 20·08 | 0 | 1 | ... | ... | ... |
| October | ... | ... | 20·80 | 0 | 1 | ... | ... | ... |
| November | ... | ... | 20·11 | 0 | 1 | ... | ... | ... |
| December | ... | ... | 20·40 | 0 | 1 | ... | ... | ... |
| January | ... | ... | 19·66 | 0 | 1 | ... | ... | ... |
| February | ... | ... | 19·69 | 0 | 1 | ... | ... | ... |
| March | ... | ... | 21·02 | 0 | 1 | ... | ... | ... |
| April | ... | ... | 21·08 | 0 | 1 | ... | ... | ... |
| May | ... | ... | 20·82 | 0 | 1 | ... | ... | ... |
| June | ... | ... | 18·41 | 0 | 1 | ... | ... | ... |
| | | | | 0 | 12 | | | |
| Belleville— | | | | | | | | |
| July | 22·41 | 21·33 | 21·87 | 0 | 2 | ... | ... | ... |
| August | 21·92 | 17·86 | 19·89 | 0 | 2 | ... | ... | ... |
| September | ... | ... | 20·70 | 0 | 1 | ... | ... | ... |
| October | 20·14 | 18·23 | 19·19 | 0 | 2 | ... | ... | ... |
| November | 20·07 | 19·90 | 19·98 | 0 | 2 | ... | ... | ... |
| December | 21·48 | 18·72 | 20·18 | 0 | 3 | ... | ... | ... |
| January | 18·75 | 15·55 | 17·15 | 1 | 2 | ... | ... | ... |
| February | 19·63 | 18·99 | 19·31 | 0 | 2 | ... | ... | ... |
| March | 20·47 | 20·46 | 20·46 | 0 | 2 | ... | ... | ... |
| April | 21·52 | 20·82 | 21·03 | 0 | 3 | ... | ... | ... |
| May | 21·92 | 19·27 | 20·31 | 0 | 3 | ... | ... | ... |
| June | 20·99 | 18·44 | 19·71 | 0 | 2 | ... | ... | ... |
| | | | | 1 | 26 | | | |
| Deseronto— | | | | | | | | |
| July | ... | ... | ... | ... | No tests. | ... | ... | ... |
| August | ... | ... | ... | ... | " | ... | ... | ... |
| September | ... | ... | ... | ... | " | ... | ... | ... |
| October | ... | ... | ... | ... | " | ... | ... | ... |
| November | ... | ... | ... | ... | " | ... | ... | ... |
| December | ... | ... | ... | ... | " | ... | ... | ... |
| January | ... | ... | ... | ... | " | ... | ... | ... |
| February | ... | ... | ... | ... | " | ... | ... | ... |
| March | ... | ... | ... | ... | " | ... | ... | ... |
| April | ... | ... | ... | ... | " | ... | ... | ... |
| May | ... | ... | ... | ... | " | ... | ... | ... |
| June | ... | ... | ... | ... | " | ... | ... | ... |
| | | | | ... | " | | | |

F.

Inspected during the Year ended June 30, 1903.

| Cubic Feet—35 Grains. | | Ammonia per 100 Cubic Feet—Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. Grains. | Lowest. Grains. | Average. Grains. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 3 | 0 | 3 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 3 | 0 | 3 | |
| .... | .... | .... | .... | .... | .... | .... | 3 | 0 | 3 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| | | | | | | | 26 | 0 | 26 | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | No tests. | Instruments out of order. |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " | |
| | | | | | | | .... | .... | " | |

## APPENDIX

### RETURN of the Illuminating Power and Purity of Gas

| Inspection Offices. | Illuminating Power—Standard, 16 Candles. Highest. | Lowest. | Average. | No. of times below standard. | No. of Tests. | Sulphur per 100 Allowance Highest | Lowest. | Average |
|---|---|---|---|---|---|---|---|---|
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Berlin— | | | | | | | | |
| July | | | 19·71 | 0 | 1 | | | |
| August | | | 18·99 | 0 | 1 | | | |
| September | | | 22·64 | 0 | 1 | | | |
| October | | | 21·99 | 0 | 1 | | | |
| November | | | 22·02 | 0 | 1 | | | |
| December | | | 22·52 | 0 | 1 | | | |
| January | | | 22·84 | 0 | 1 | | | |
| February | | | 24·96 | 0 | 1 | | | |
| March | | | 23·36 | 0 | 6 | | | |
| April | | | 18·64 | 0 | 1 | | | |
| May | | | 20·65 | 0 | 1 | | | |
| June | | | 19·44 | 0 | 1 | | | |
| | | | | 0 | 17 | | | |
| Brockville— | | | | | | | | |
| July | | | 19·02 | 0 | 1 | | | |
| August | | | 18·01 | 0 | 1 | | | |
| September | | | 20·03 | 0 | 1 | | | |
| October | | | 16·28 | 0 | 1 | | | |
| November | | | 18·95 | 0 | 1 | | | |
| December | | | 19·54 | 0 | 1 | | | |
| January | | | 19·82 | 0 | 1 | | | |
| February | | | 18·06 | 0 | 1 | | | |
| March | | | 18·40 | 0 | 1 | | | |
| April | | | 18·98 | 0 | 1 | | | |
| May | | | 19·04 | 0 | 1 | | | |
| June | | | 20·66 | 0 | 1 | | | |
| | | | | 0 | 12 | | | |
| Cobourg— | | | | | | | | |
| July | | | 18·53 | 0 | 1 | | | |
| August | | | 18·44 | 0 | 1 | | | |
| September | | | 20·43 | 0 | 1 | | | |
| October | | | 18·81 | 0 | 1 | | | |
| November | | | 18·34 | 0 | 1 | | | |
| December | | | 17·50 | 0 | 1 | | | |
| January | | | 17·78 | 0 | 1 | | | |
| February | | | 17·43 | 0 | 1 | | | |
| March | | | 17·00 | 0 | 1 | | | |
| April | | | 19·97 | 0 | 1 | | | |
| May | | | 18·94 | 0 | 1 | | | |
| June | | | 19·29 | 0 | 1 | | | |
| | | | | 0 | 12 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet—35 Grains. | | Ammonia per 100 Cubic Feet—Allowance 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. Grains. | Lowest. Grains. | Average. Grains. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 0 | 4 | 4 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 5 | 6 | |
| .... | .... | .... | .... | .... | .... | .... | 5 | 1 | 6 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 15 | 10 | 25 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 0 | 3 | 3 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 1 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 1 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 0 | 3 | 3 | |
| | | | | | | | 18 | 8 | 26 | |

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. Highest. | Lowest. | Average. | No. of times below standard. | No. of Tests. | SULPHUR PER 100 ALLOWANCE, Highest | Lowest. | Average |
|---|---|---|---|---|---|---|---|---|
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Port Hope— | | | | | | | | |
| July | | | 17·63 | 0 | 1 | | | |
| August | | | 19·96 | 0 | 1 | | | |
| September | | | 19·91 | 0 | 1 | | | |
| October | | | 18·31 | 0 | 1 | | | |
| November | | | 18·16 | 0 | 1 | | | |
| December | | | 18·62 | 0 | 1 | | | |
| January | | | 17·87 | 0 | 1 | | | |
| February | | | 17·93 | 0 | 1 | | | |
| March | | | 19·52 | 0 | 1 | | | |
| April | | | 18·03 | 0 | 1 | | | |
| May | | | 18·89 | 0 | 1 | | | |
| June | | | 20·77 | 0 | 1 | | | |
| | | | | 0 | 12 | | | |
| Cornwall— | | | | | | | | |
| July | | | 18·70 | 0 | 1 | | | |
| August | | | 18·00 | 0 | 1 | | | |
| September | | | 18·10 | 0 | 1 | | | |
| October | | | 18·20 | 0 | 1 | | | |
| November | | | 18·30 | 0 | 1 | | | |
| December | | | 18·10 | 0 | 1 | | | |
| January | | | 18·62 | 0 | 1 | | | |
| February | | | 18·05 | 0 | 1 | | | |
| March | | | 18·10 | 0 | 1 | | | |
| April | | | 18·70 | 0 | 1 | | | |
| May | | | 18·40 | 0 | 1 | | | |
| June | | | 18·00 | 0 | 1 | | | |
| | | | | 0 | 12 | | | |
| Guelph— | | | | | | | | |
| July | | | 21·72 | 0 | 1 | | | |
| August | | | 20·48 | 0 | 1 | | | |
| September | | | 20·77 | 0 | 1 | | | |
| October | | | 21·27 | 0 | 1 | | | |
| November | | | 20·16 | 0 | 1 | | | |
| December | | | 20·68 | 0 | 1 | | | |
| January | | | 20·01 | 0 | 1 | | | |
| February | | | 21·10 | 0 | 1 | | | |
| March | | | 20·63 | 0 | 1 | | | |
| April | | | 18·31 | 0 | 1 | | | |
| May | | | 19·70 | 0 | 1 | | | |
| June | | | 19·32 | 0 | 1 | | | |
| | | | | 0 | 12 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet. 35 Grains. | | Ammonia per 100 Cubic Feet. Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| ... | ... | ... | ... | ... | ... | ... | 3 | 1 | 4 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| | | | | | | | 25 | 1 | 26 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |

## APPENDIX

Return of the Illuminating Power and Purity of Gas

| Inspection Offices. | Illuminating Power—Standard, 16 Candles. | | | | | Sulphur per 100 Allowance, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Hamilton— | | | | | | | | |
| July | 18·60 | 17·85 | 17·92 | 0 | 2 | ...... | ...... | ...... |
| August | 18·44 | 18·33 | 18·38 | 0 | 2 | ...... | ...... | ...... |
| September | 19 09 | 18·22 | 18·65 | 0 | 2 | ...... | ...... | ...... |
| October | 18·94 | 18·60 | 18·77 | 0 | 2 | ...... | ...... | ...... |
| November | 18·47 | 18·29 | 18·38 | 0 | 2 | ...... | ...... | ...... |
| December | 18·36 | 18·27 | 18·31 | 0 | 2 | ...... | ...... | ...... |
| January | 18·37 | 18·27 | 18·32 | 0 | 2 | ...... | ...... | ...... |
| February | 18·15 | 18·00 | 18·07 | 0 | 2 | ...... | ...... | ...... |
| March | 18·52 | 18·13 | 18·32 | 0 | 2 | ...... | ...... | ...... |
| April | 18·02 | 17·85 | 17·93 | 0 | 2 | ...... | ...... | ...... |
| May | 18·15 | 17·80 | 17·97 | 0 | 2 | ...... | ...... | ...... |
| June | 18·22 | 18·06 | 18·14 | 0 | 2 | ...... | ...... | ...... |
| | | | | 0 | 24 | | | |
| Brantford— | | | | | | | | |
| July | ...... | ...... | 20·82 | 0 | 1 | ...... | ...... | ...... |
| August | ...... | ...... | 20·04 | 0 | 1 | ...... | ...... | ...... |
| September | ...... | ...... | 20·02 | 0 | 1 | ...... | ...... | ...... |
| October | ...... | ...... | 20·69 | 0 | 1 | ...... | ...... | ...... |
| November | ...... | ...... | 19·70 | 0 | 1 | ...... | ...... | ...... |
| December | ...... | ...... | 20·12 | 0 | 1 | ...... | ...... | ...... |
| January | ...... | ...... | 20·06 | 0 | 1 | ...... | ...... | ...... |
| February | ...... | ...... | 20·16 | 0 | 1 | ...... | ...... | ...... |
| March | ...... | ...... | 20·76 | 0 | 1 | ...... | ...... | ...... |
| April | ...... | ...... | 20·23 | 0 | 1 | ...... | ...... | ...... |
| May | ...... | ...... | 20·67 | 0 | 1 | ...... | ...... | ...... |
| June | ...... | ...... | 19·52 | 0 | 1 | ...... | ...... | ...... |
| | | | | 0 | 12 | | | |
| Dundas— | | | | | | | | |
| July | ...... | ...... | 18·86 | 0 | 1 | ...... | ...... | ...... |
| August | ...... | ...... | 18·24 | 0 | 1 | ...... | ...... | ...... |
| September | ...... | ...... | 19·03 | 0 | 1 | ...... | ...... | ...... |
| October | ...... | ...... | 18·21 | 0 | 1 | ...... | ...... | ...... |
| November | ...... | ...... | 18·37 | 0 | 1 | ...... | ...... | ...... |
| December | ...... | ...... | 18·63 | 0 | 1 | ...... | ...... | ...... |
| January | ...... | ...... | 19·64 | 0 | 1 | ...... | ...... | ...... |
| February | ...... | ...... | 19·47 | 0 | 1 | ...... | ...... | ...... |
| March | ...... | ...... | 18·06 | 0 | 1 | ...... | ...... | ...... |
| April | ...... | ...... | 19·50 | 0 | 1 | ...... | ...... | ...... |
| May | ...... | ...... | 19·07 | 0 | 1 | ...... | ...... | ...... |
| June | ...... | ...... | 19·18 | 0 | 1 | ...... | ...... | ...... |
| | | | | 0 | 12 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| CUBIC FEET—35 GRAINS. | | AMMONIA PER 100 CUBIC FEET—ALLOWANCE, 4 GRAINS. | | | | | SULPHURETTED HYDROGEN. | | | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| | | | | | | | 24 | 0 | 24 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. | | | | | SULPHUR PER 100 ALLOWANCE, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Galt— | | | | | | | | |
| July | ........ | ........ | 20·02 | 0 | 1 | ........ | ........ | ........ |
| August | ........ | ........ | 22·02 | 0 | 1 | ........ | ........ | ........ |
| September | ........ | ........ | 19·35 | 0 | 1 | ........ | ........ | ........ |
| October | ........ | ........ | 20·42 | 0 | 1 | ........ | ........ | ........ |
| November | ........ | ........ | 21·00 | 0 | 1 | ........ | ........ | ........ |
| December | ........ | ........ | 18·24 | 0 | 1 | ........ | ........ | ........ |
| January | ........ | ........ | 20·42 | 0 | 1 | ........ | ........ | ........ |
| February | ........ | ........ | 18·81 | 0 | 1 | ........ | ........ | ........ |
| March | ........ | ........ | 18·02 | 0 | 1 | ........ | ........ | ........ |
| April | ........ | ........ | 19·00 | 0 | 1 | ........ | ........ | ........ |
| May | ........ | ........ | 18·02 | 0 | 1 | ........ | ........ | ........ |
| June | ........ | ........ | 20·15 | 0 | 1 | ........ | ........ | ........ |
| | | | | 0 | 12 | | | |
| St. Catharines— | | | | | | | | |
| July | ........ | ........ | 20·32 | 0 | 1 | ........ | ........ | ........ |
| August | ........ | ........ | 21·12 | 0 | 1 | ........ | ........ | ........ |
| September | ........ | ........ | 20·34 | 0 | 1 | ........ | ........ | ........ |
| October | ........ | ........ | 20·50 | 0 | 1 | ........ | ........ | ........ |
| November | ........ | ........ | 20·19 | 0 | 1 | ........ | ........ | ........ |
| December | ........ | ........ | 20·39 | 0 | 1 | ........ | ........ | ........ |
| January | ........ | ........ | 19·96 | 0 | 1 | ........ | ........ | ........ |
| February | ........ | ........ | 20·39 | 0 | 1 | ........ | ........ | ........ |
| March | ........ | ........ | 19·21 | 0 | 1 | ........ | ........ | ........ |
| April | ........ | ........ | 20·39 | 0 | 1 | ........ | ........ | ........ |
| May | ........ | ........ | 20·32 | 0 | 1 | ........ | ........ | ........ |
| June | ........ | ........ | 18·80 | 0 | 1 | ........ | ........ | ........ |
| | | | | 0 | 12 | | | |
| Kingston— | | | | | | | | |
| July | 21·80 | 21·60 | 21·70 | 0 | 2 | ........ | ........ | ........ |
| August | 22·20 | 21·90 | 22·05 | 0 | 2 | ........ | ........ | ........ |
| September | 22·20 | 21·70 | 21·95 | 0 | 2 | ........ | ........ | ........ |
| October | 22·50 | 22·18 | 22·34 | 0 | 2 | ........ | ........ | ........ |
| November | 22·30 | 22·18 | 22·24 | 0 | 2 | ........ | ........ | ........ |
| December | 22 20 | 22·16 | 22·18 | 0 | 2 | ........ | ........ | ........ |
| January | 22·66 | 21·80 | 22·23 | 0 | 2 | ........ | ........ | ........ |
| February | 21·80 | 21·55 | 21·67 | 0 | 2 | ........ | ........ | ........ |
| March | 22·10 | 21·60 | 21·85 | 0 | 2 | ........ | ........ | ........ |
| April | 22·50 | 19·90 | 21·20 | 0 | 2 | ........ | ........ | ........ |
| May | 21·90 | 21·80 | 21·85 | 0 | 2 | ........ | ........ | ........ |
| June | 21·90 | 21·50 | 21·70 | 0 | 2 | ........ | ........ | ........ |
| | | | | 0 | 24 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet—35 Grains. | | Ammonia per 100 Cubic Feet—Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| | | | | | | | 24 | 0 | 24 | |

## APPENDIX

### RETURN of the Illuminating Power and Purity of Gas

| Inspection Offices. | Illuminating Power—Standard, 16 Candles. | | | | | Sulphur per 100 Allowance, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below standard. | No. of Tests. | Highest | Lowest | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Listowel— | | | | | | | | |
| July | ...... | ...... | 21·65 | 0 | 1 | ...... | ...... | ...... |
| August | ...... | ...... | 20·85 | 0 | 1 | ...... | ...... | ...... |
| September | ...... | ...... | 20·66 | 0 | 1 | ...... | ...... | ...... |
| October | ...... | ...... | 19·49 | 0 | 1 | ...... | ...... | ...... |
| November | ...... | ...... | 19·49 | 0 | 1 | ...... | ...... | ...... |
| December | ...... | ...... | 16·49 | 0 | 1 | ...... | ...... | ...... |
| January | ...... | ...... | 16·49 | 0 | 1 | ...... | ...... | ...... |
| February | ...... | ...... | 16·15 | 0 | 1 | ...... | ...... | ...... |
| March | ...... | ...... | 20·29 | 0 | 1 | ...... | ...... | ...... |
| April | ...... | ...... | 18·93 | 0 | 1 | ...... | ...... | ...... |
| May | ...... | ...... | 20·66 | 0 | 1 | ...... | ...... | ...... |
| June | ...... | ...... | 20·66 | 0 | 1 | ...... | ...... | ...... |
| | | | | 0 | 12 | | | |
| London— | | | | | | | | |
| July | 17·48 | 16·86 | 17·17 | 0 | 2 | ...... | ...... | ...... |
| August | 19·60 | 16·31 | 17·95 | 0 | 2 | ...... | ...... | ...... |
| September | 18·68 | 17·69 | 18·18 | 0 | 2 | ...... | ...... | ...... |
| October | 19·67 | 18·80 | 19·23 | 0 | 2 | ...... | ...... | ...... |
| November | 20·67 | 20·55 | 20·61 | 0 | 2 | ...... | ...... | ...... |
| December | 18·87 | 18·02 | 18·44 | 0 | 2 | ...... | ...... | ...... |
| January | 20·39 | 17·53 | 18·92 | 0 | 2 | ...... | ...... | ...... |
| February | 18·14 | 17·38 | 17·76 | 0 | 2 | ...... | ...... | ...... |
| March | 18·58 | 17·55 | 18·06 | 0 | 3 | ...... | ...... | ...... |
| April | 17·61 | 17·00 | 17·30 | 0 | 2 | ...... | ...... | ...... |
| May | 21·43 | 20·10 | 20·76 | 0 | 2 | ...... | ...... | ...... |
| June | 20·76 | 18·52 | 19·64 | 0 | 2 | ...... | ...... | ...... |
| | | | | 0 | 24 | | | |
| Chatham— | | | | | | | | |
| July | ...... | ...... | 16·60 | 0 | 1 | ...... | ...... | ...... |
| August | ...... | ...... | 16·68 | 0 | 1 | ...... | ...... | ...... |
| September | ...... | ...... | 16·60 | 0 | 1 | ...... | ...... | ...... |
| October | ...... | ...... | 13·53 | 1 | 1 | ...... | ...... | ...... |
| November | ...... | ...... | 14·84 | 1 | 1 | ...... | ...... | ...... |
| December | ...... | ...... | 14·69 | 1 | 1 | ...... | ...... | ...... |
| January | ...... | ...... | 12·82 | 1 | 1 | ...... | ...... | ...... |
| February | ...... | ...... | 15·36 | 1 | 1 | ...... | ...... | ...... |
| March | ...... | ...... | 15·31 | 1 | 1 | ...... | ...... | ...... |
| April | ...... | ...... | 12·69 | 1 | 1 | ...... | ...... | ...... |
| May | 18·03 | 17·16 | 17·59 | 0 | 2 | ...... | ...... | ...... |
| June | ...... | ...... | 17·05 | 0 | 1 | ...... | ...... | ...... |
| | | | | 7 | 13 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| CUBIC FEET. 35 GRAINS. | | AMMONIA PER 100 CUBIC FEET—ALLOWANCE, 4 GRAINS. | | | | | SULPHURETTED HYDROGEN. | | | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| | | | | | | | 24 | 0 | 24 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 2 | 0 | 2 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 13 | 0 | 13 | |

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| Inspection Offices. | Illuminating Power—Standard, 16 Candles. | | | | | Sulphur per 100 Allowance. | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below Standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Ingersoll— | | | | | | | | |
| July | ... | ... | 23·49 | 0 | 1 | ... | ... | ... |
| August | ... | ... | 18·35 | 0 | 1 | ... | ... | ... |
| September | ... | ... | 17·45 | 0 | 1 | ... | ... | ... |
| October | ... | ... | 19·08 | 0 | 1 | ... | ... | ... |
| November | ... | ... | 16·82 | 0 | 1 | ... | ... | ... |
| December | ... | ... | 25·07 | 0 | 1 | ... | ... | ... |
| January | ... | ... | 25·14 | 0 | 1 | ... | ... | ... |
| February | ... | ... | 19·58 | 0 | 1 | ... | ... | ... |
| March | ... | ... | 19·46 | 0 | 1 | ... | ... | ... |
| April | ... | ... | 21·14 | 0 | 1 | ... | ... | ... |
| May | ... | ... | 17·05 | 0 | 1 | ... | ... | ... |
| June | ... | ... | 19·46 | 0 | 1 | ... | ... | ... |
| | | | | 0 | 12 | | | |
| St. Thomas— | | | | | | | | |
| July | ... | ... | 17·26 | 0 | 1 | ... | ... | ... |
| August | ... | ... | 17·28 | 0 | 1 | ... | ... | ... |
| September | ... | ... | 17·36 | 0 | 1 | ... | ... | ... |
| October | ... | ... | 18·29 | 0 | 1 | ... | ... | ... |
| November | ... | ... | 18·37 | 0 | 1 | ... | ... | ... |
| December | ... | ... | 16·20 | 0 | 1 | ... | ... | ... |
| January | ... | ... | 17·49 | 0 | 1 | ... | ... | ... |
| February | ... | ... | 15·44 | 1 | 1 | ... | ... | ... |
| March | ... | ... | 17·17 | 0 | 1 | ... | ... | ... |
| April | ... | ... | 16·26 | 0 | 1 | ... | ... | ... |
| May | ... | ... | 17·70 | 0 | 1 | ... | ... | ... |
| June | ... | ... | 16·06 | 0 | 1 | ... | ... | ... |
| | | | | 1 | 12 | | | |
| Windsor— | | | | | | | | |
| July | ... | ... | 17·41 | 0 | 1 | ... | ... | ... |
| August | ... | ... | 17·56 | 0 | 1 | ... | ... | ... |
| September | ... | ... | 18·73 | 0 | 1 | ... | ... | ... |
| October | ... | ... | 17·63 | 0 | 1 | ... | ... | ... |
| November | ... | ... | 18·34 | 0 | 1 | ... | ... | ... |
| December | ... | ... | 17·61 | 0 | 1 | ... | ... | ... |
| January | ... | ... | 17·84 | 0 | 1 | ... | ... | ... |
| February | ... | ... | 17·97 | 0 | 1 | ... | ... | ... |
| March | ... | ... | 16·29 | 0 | 1 | ... | ... | ... |
| April | ... | ... | 19·64 | 0 | 1 | ... | ... | ... |
| May | ... | ... | 17·80 | 0 | 1 | ... | ... | ... |
| June | ... | ... | 17·38 | 0 | 1 | ... | ... | ... |
| | | | | 0 | 12 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet. 35 Grains. | | Ammonia per 100 Cubic Feet—Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. Grains. | Lowest. Grains. | Average. Grains. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. | | | | | SULPHUR PER 100 ALLOWANCE, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. Candles. | Lowest. Candles. | Average. Candles. | No. of times below standard. | No. of Tests. | Highest Grains. | Lowest. Grains. | Average Grains. |
| Woodstock— | | | | | | | | |
| July | ........ | ........ | 27·26 | 0 | 1 | ........ | ........ | ........ |
| August | ........ | ........ | 25·00 | 0 | 1 | ........ | ........ | ........ |
| September | ........ | ........ | 24·50 | 0 | 1 | ........ | ........ | ........ |
| October | ........ | ........ | 27·73 | 0 | 1 | ........ | ........ | ........ |
| November | ........ | ........ | 29·70 | 0 | 1 | ........ | ........ | ........ |
| December | ........ | ........ | 23·98 | 0 | 1 | ........ | ........ | ........ |
| January | ........ | ........ | 27·72 | 0 | 1 | ........ | ........ | ........ |
| February | ........ | ........ | 29·16 | 0 | 1 | ........ | ........ | ........ |
| March | ........ | ........ | 23·66 | 0 | 1 | ........ | ........ | ........ |
| April | ........ | ........ | 26·08 | 0 | 1 | ........ | ........ | ........ |
| May | ........ | ........ | 20·44 | 0 | 1 | ........ | ........ | ........ |
| June | ........ | ........ | 17·24 | 0 | 1 | ........ | ........ | ........ |
| | | | | 0 | 12 | | | |
| Napanee— | | | | | | | | |
| July | ........ | ........ | 22·81 | 0 | 1 | ........ | ........ | ........ |
| August | ........ | ........ | 21·41 | 0 | 1 | ........ | ........ | ........ |
| September | ........ | ........ | 22·32 | 0 | 1 | ........ | ........ | ........ |
| October | ........ | ........ | 20·70 | 0 | 1 | ........ | ........ | ........ |
| November | ........ | ........ | 21·32 | 0 | 1 | ........ | ........ | ........ |
| December | ........ | ........ | 21·52 | 0 | 1 | ........ | ........ | ........ |
| January | ........ | ........ | 17·41 | 0 | 1 | ........ | ........ | ........ |
| February | ........ | ........ | 19·06 | 0 | 1 | ........ | ........ | ........ |
| March | ........ | ........ | 20·40 | 0 | 1 | ........ | ........ | ........ |
| April | ........ | ........ | 20·07 | 0 | 1 | ........ | ........ | ........ |
| May | ........ | ........ | 21·33 | 0 | 1 | ........ | ........ | ........ |
| June | ........ | ........ | 21·81 | 0 | 1 | ........ | ........ | ........ |
| | | | | 0 | 12 | | | |
| Ottawa— | | | | | | | | |
| July | 21·69 | 21·54 | 21·61 | 0 | 2 | 15·03 | 14·40 | 14·71 |
| August | 21·76 | 21·65 | 21·70 | 0 | 2 | 14·97 | 14·59 | 14·78 |
| September | 21·36 | 21·30 | 21·33 | 0 | 2 | 15·19 | 14·30 | 14·74 |
| October | 21·55 | 21·38 | 21·46 | 0 | 2 | 14·52 | 14·18 | 14·35 |
| November | 21·47 | 21·43 | 21·45 | 0 | 2 | 14·97 | 14·60 | 14·78 |
| December | 21·97 | 21·45 | 21·71 | 0 | 2 | 14·47 | 14·03 | 14·25 |
| January | 21·60 | 21·25 | 21·42 | 0 | 2 | 15·10 | 14·58 | 14·84 |
| February | 22·19 | 18·98 | 20·58 | 0 | 2 | 15·78 | 14·97 | 15·37 |
| March | 20·19 | 20·02 | 20·10 | 0 | 2 | 15·59 | 14·97 | 15·28 |
| April | 20·04 | 19·94 | 19·99 | 0 | 2 | 15·04 | 14·52 | 14·78 |
| May | 21·85 | 20·10 | 20·97 | 0 | 2 | 15·19 | 14·97 | 15·08 |
| June | 20·05 | 19·77 | 19·91 | 0 | 2 | 14·59 | 14·20 | 14·39 |
| | | | | 0 | 24 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet—35 Grains. | | Ammonia per 100 Cubic Feet—Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. Grains. | Lowest. Grains. | Average. Grains. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | .... | .... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 24 | | | 0 | 0 | 24 | 24 | 0 | 24 | |

## APPENDIX

### RETURN of the Illuminating Power and Purity of Gas

| Inspection Offices. | Illuminating Power—Standard, 16 Candles. | | | | | Sulphur per 100 Allowance, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below Standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Owen Sound— | | | | | | | | |
| July | ....... | ....... | 21·40 | 0 | 1 | ....... | ....... | ....... |
| August | ....... | ....... | 22·00 | 0 | 1 | ....... | ....... | ....... |
| September | ....... | ....... | 21·60 | 0 | 1 | ....... | ....... | ....... |
| October | ....... | ....... | 20·50 | 0 | 1 | ....... | ....... | ....... |
| November | ....... | ....... | 22·50 | 0 | 1 | ....... | ....... | ....... |
| December | ....... | ....... | 22·66 | 0 | 1 | ....... | ....... | ....... |
| January | ....... | ....... | 21·00 | 0 | 1 | ....... | ....... | ....... |
| February | ....... | ....... | 21·09 | 0 | 1 | ....... | ....... | ....... |
| March | ....... | ....... | 22·54 | 0 | 1 | ....... | ....... | ....... |
| April | ....... | ....... | 21·00 | 0 | 1 | ....... | ....... | ....... |
| May | ....... | ....... | 21·75 | 0 | 1 | ....... | ....... | ....... |
| June | ....... | ....... | 21·82 | 0 | 1 | ....... | ....... | ....... |
| | | | | 0 | 12 | | | |
| Peterborough— | | | | | | | | |
| July | 20·00 | 19·00 | 19·50 | 0 | 2 | ....... | ....... | ....... |
| August | 22·40 | 20·20 | 21·30 | 0 | 2 | ....... | ....... | ....... |
| September | 22·60 | 22·56 | 22·58 | 0 | 2 | ....... | ....... | ....... |
| October | 21·21 | 20·80 | 21·00 | 0 | 2 | ....... | ....... | ....... |
| November | 21·76 | 21·10 | 21·43 | 0 | 2 | ....... | ....... | ....... |
| December | 21·84 | 21·68 | 21·76 | 0 | 2 | ....... | ....... | ....... |
| January | 21·06 | 21·02 | 21·04 | 0 | 2 | ....... | ....... | ....... |
| February | 19·60 | 19·00 | 19·30 | 0 | 2 | ....... | ....... | ....... |
| March | 22·00 | 19·30 | 20·65 | 0 | 2 | ....... | ....... | ....... |
| April | 19·20 | 17·60 | 18·40 | 0 | 2 | ....... | ....... | ....... |
| May | 21·42 | 20·00 | 20·71 | 0 | 2 | ....... | ....... | ....... |
| June | ....... | ....... | 19·35 | 0 | 1 | ....... | ....... | ....... |
| | | | | 0 | 23 | | | |
| Sarnia— | | | | | | | | |
| July | ....... | ....... | 20·17 | 0 | 1 | ....... | ....... | ....... |
| August | ....... | ....... | 20·47 | 0 | 1 | ....... | ....... | ....... |
| September | ....... | ....... | 21·52 | 0 | 1 | ....... | ....... | ....... |
| October | ....... | ....... | 20·24 | 0 | 1 | ....... | ....... | ....... |
| November | ....... | ....... | 18·20 | 0 | 1 | ....... | ....... | ....... |
| December | ....... | ....... | 21·45 | 0 | 1 | ....... | ....... | ....... |
| January | ....... | ....... | 20·40 | 0 | 1 | ....... | ....... | ....... |
| February | ....... | ....... | 20·50 | 0 | 1 | ....... | ....... | ....... |
| March | ....... | ....... | 20·90 | 0 | 1 | ....... | ....... | ....... |
| April | ....... | ....... | 20·23 | 0 | 1 | ....... | ....... | ....... |
| May | ....... | ....... | 20·40 | 0 | 1 | ....... | ....... | ....... |
| June | ....... | ....... | ....... | ....... | ....... | ....... | ....... | ....... |
| | | | | 0 | 11 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| CUBIC FEET—35 GRAINS. | | AMMONIA PER 100 CUBIC FEET—ALLOWANCE, 4 GRAINS. | | | | | SULPHURETTED HYDROGEN. | | | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 1 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| ... | ... | ... | ... | ... | ... | ... | 2 | 0 | 2 | |
| | | | | | | | 23 | 1 | 24 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| | | | | | | | 11 | 0 | 11 | |

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. | | | | | SULPHUR PER 100 ALLOWANCE, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Stratford— | | | | | | | | |
| July | ........ | ........ | 17·23 | 0 | 1 | ........ | ........ | ........ |
| August | ........ | ........ | 17·26 | 0 | 1 | ........ | ........ | ........ |
| September | ........ | ........ | 18·05 | 0 | 1 | ........ | ........ | ........ |
| October | ........ | ........ | 16·37 | 0 | 1 | ........ | ........ | ........ |
| November | ........ | ........ | 18·00 | 0 | 1 | ........ | ........ | ........ |
| December | ........ | ........ | 16·36 | 0 | 1 | ........ | ........ | ........ |
| January | ........ | ........ | 16·71 | 0 | 1 | ........ | ........ | ........ |
| February | ........ | ........ | 16·21 | 0 | 1 | ........ | ........ | ........ |
| March | ........ | ........ | 16·51 | 0 | 1 | ........ | ........ | ........ |
| April | ........ | ........ | 17·02 | 0 | 1 | ........ | ........ | ........ |
| May | ........ | ........ | 16·89 | 0 | 1 | ........ | ........ | ........ |
| June | ........ | ........ | 17·30 | 0 | 1 | ........ | ........ | ........ |
| | | | | 0 | 12 | | | |
| Toronto— | | | | | | | | |
| July | 19·64 | 19·16 | 19·35 | 0 | 9 | 13·43 | 11·43 | 12·43 |
| August | 20·65 | 19·21 | 19·86 | 0 | 9 | 16·63 | 12·50 | 14·56 |
| September | 19·37 | 18·66 | 19·00 | 0 | 8 | 18·59 | 18·31 | 18·45 |
| October | 19·49 | 18·88 | 19·11 | 0 | 9 | 22·52 | 15·50 | 19·01 |
| November | 19·96 | 17·27 | 19·07 | 0 | 8 | 19·74 | 17·08 | 18·41 |
| December | 20·06 | 16 65 | 17·65 | 0 | 10 | 19·70 | 16·80 | 18·28 |
| January | 18·83 | 16·79 | 17·43 | 0 | 9 | 19·14 | 17·91 | 18·52 |
| February | 18·47 | 16·79 | 17·81 | 0 | 8 | 16·73 | 15·69 | 16·21 |
| March | 17·73 | 17·10 | 17·32 | 0 | 8 | 16·61 | 12·68 | 14·64 |
| April | 19·56 | 17·42 | 18·64 | 0 | 9 | 20·80 | 12·46 | 16·63 |
| May | 18·92 | 18·14 | 18·51 | 0 | 9 | 18·08 | 16·00 | 17·04 |
| June | 19·08 | 18·62 | 18·88 | 0 | 9 | 19·60 | 18·30 | 18·95 |
| | | | | 0 | 105 | | | |
| Montreal— | | | | | | | | |
| July | 19·82 | 18·38 | 18·90 | 0 | 9 | 28·31 | 19·89 | 24·10 |
| August | 20·46 | 18·00 | 18·44 | 0 | 9 | 16·27 | 5·41 | 10·84 |
| September | 19·72 | 16·49 | 18·43 | 0 | 9 | 33·21 | 25·62 | 29·41 |
| October | 20·17 | 16·95 | 18·62 | 0 | 8 | 24·47 | 19·91 | 22·19 |
| November | 20·18 | 17·59 | 19·09 | 0 | 9 | 26·96 | 25·30 | 26·13 |
| December | 20·30 | 16·92 | 18·55 | 0 | 9 | 18·37 | 17·86 | 18·11 |
| January | 19·85 | 17 25 | 18·08 | 0 | 9 | 22·27 | 14·77 | 18·52 |
| February | 19·32 | 17·32 | 18·46 | 0 | 8 | 21·61 | 16·78 | 19·19 |
| March | 18·61 | 16·48 | 17·67 | 0 | 9 | 23·09 | 16·17 | 19·63 |
| April | 19·53 | 17·10 | 18·31 | 0 | 8 | 29 61 | 10·08 | 19·85 |
| May | 19·65 | 17·79 | 18·88 | 0 | 9 | 8·64 | 4·48 | 6·74 |
| June | 19·92 | 18·16 | 19·38 | 0 | 9 | 28·08 | 11·35 | 19·71 |
| | | | | 0 | 105 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet—35 Grains. | | Ammonia per 100 Cubic Feet—Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. Grains. | Lowest. Grains. | Average. Grains. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| ...... | ...... | ...... | ...... | ...... | ...... | ... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| 0 | 2 | 0·97 | 0·52 | 0·74 | 0 | 2 | 9 | 0 | 9 | |
| 0 | 2 | 1·26 | 0·92 | 1·09 | 0 | 2 | 9 | 0 | 9 | |
| 0 | 2 | 1·35 | 1·23 | 1·29 | 0 | 2 | 8 | 0 | 8 | |
| 0 | 2 | 1·48 | 1·07 | 1·27 | 0 | 2 | 9 | 0 | 9 | |
| 0 | 2 | 1·54 | 1·26 | 1·40 | 0 | 2 | 8 | 0 | 8 | |
| 0 | 2 | 1·74 | 0·97 | 1·35 | 0 | 2 | 10 | 0 | 10 | |
| 0 | 2 | 1·77 | 1·28 | 1·52 | 0 | 2 | 9 | 0 | 9 | |
| 0 | 2 | 0·79 | 0·40 | 0·59 | 0 | 2 | 8 | 0 | 8 | |
| 0 | 2 | 0·85 | 0·70 | 0·77 | 0 | 2 | 8 | 0 | 8 | |
| 0 | 2 | 1·02 | 0·92 | 0·97 | 0 | 2 | 9 | 0 | 9 | |
| 0 | 2 | 0·81 | 0·76 | 0·78 | 0 | 2 | 9 | 0 | 9 | |
| 0 | 2 | 1·12 | 0·76 | 0·94 | 0 | 2 | 9 | 0 | 9 | |
| 0 | 24 | | | | 0 | 24 | 105 | 0 | 105 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 13 | 0 | 13 | |
| 0 | 2 | 3·71 | 0·00 | 1·85 | 0 | 2 | 13 | 0 | 13 | |
| 0 | 2 | 1·51 | 1·02 | 1·26 | 0 | 2 | 12 | 0 | 12 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 12 | 0 | 12 | |
| 0 | 2 | 0·25 | 0·00 | 0·12 | 0 | 2 | 12 | 0 | 12 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 14 | 0 | 14 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 12 | 0 | 12 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 12 | 0 | 12 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 12 | 0 | 12 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 11 | 0 | 11 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 13 | 0 | 13 | |
| 0 | 2 | ...... | ...... | 0·00 | 0 | 2 | 13 | 0 | 13 | |
| 0 | 24 | | | | 0 | 24 | 149 | 0 | 149 | |

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. | | | | | SULPHUR PER 100 ALLOWANCE, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below Standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Quebec— | | | | | | | | |
| July | | | 17·88 | 0 | 1 | 21·47 | 15·97 | 18·72 |
| August | | | 18·15 | 0 | 1 | 21·04 | 20·22 | 20·63 |
| September | | | 17·61 | 0 | 1 | 18·42 | 17·39 | 17·90 |
| October | | | 18·50 | 0 | 1 | 23·21 | 17·64 | 20·42 |
| November | | | 17·49 | 0 | 1 | 19·86 | 18·13 | 18·99 |
| December | | | 18·55 | 0 | 1 | 22·06 | 17·38 | 19·72 |
| January | | | 18·07 | 0 | 1 | 22·96 | 20·86 | 21·91 |
| February | | | 18·03 | 0 | 1 | 21·07 | 21·06 | 21·06 |
| March | | | 18·20 | 0 | 1 | 21·52 | 17·75 | 19·63 |
| April | | | 18·11 | 0 | 1 | 19·89 | 19·57 | 19·73 |
| May | | | 18·01 | 0 | 1 | 21·55 | 17·62 | 19·58 |
| June | | | 18·33 | 0 | 1 | 19·79 | 18·61 | 19·20 |
| | | | | 0 | 12 | | | |
| Sherbrooke— | | | | | | | | |
| July | | | 19·47 | 0 | 1 | | | |
| August | | | 18·83 | 0 | 1 | | | |
| September | | | 19·18 | 0 | 1 | | | |
| October | | | 19·25 | 0 | 1 | | | |
| November | | | 18·83 | 0 | 1 | | | |
| December | | | 17·24 | 0 | 1 | | | |
| January | | | 18·83 | 0 | 1 | | | |
| February | | | 19·80 | 0 | 1 | | | |
| March | | | 19·18 | 0 | 1 | | | |
| April | | | 18·73 | 0 | 1 | | | |
| May | | | 19·98 | 0 | 1 | | | |
| June | | | 19·00 | 0 | 1 | | | |
| | | | | 0 | 12 | | | |
| St. Hyacinthe— | | | | | | | | |
| July | | | | | | | | |
| August | | | | | | | | |
| September | | | | | | | | |
| October | | | | | | | | |
| November | | | | | | | | |
| December | | | | | | | | |
| January | | | | | | | | |
| February | | | 18·71 | 0 | 1 | | | |
| March | | | 18·86 | 0 | 1 | | | |
| April | | | 18·71 | 0 | 1 | | | |
| May | | | 18·71 | 0 | 1 | | | |
| June | | | 18·74 | 0 | 1 | | | |
| | | | | 0 | 5 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet—35 Grains. | | Ammonia per 100 Cubic Feet—Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 2 | ... | ... | 0 | 0 | 2 | 2 | 0 | 2 | |
| 0 | 24 | | | | 0 | 24 | 24 | 0 | 24 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 5 | 0 | 5 | |

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER STANDARD, 16 CANDLES. | | | | | SULPHUR PER 100 ALLOWANCE, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below Standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Fredericton— | | | | | | | | |
| July | 17·58 | 16·64 | 17·22 | 0 | 5 | ..... | ..... | ..... |
| August | 17·77 | 16·16 | 17·15 | 0 | 5 | ..... | ..... | ..... |
| September | 17·34 | 16·01 | 17·14 | 0 | 5 | ..... | ..... | ..... |
| October | 17·11 | 16·43 | 16·78 | 0 | 5 | ..... | ..... | ..... |
| November | 16·68 | 15·74 | 16·17 | 2 | 5 | ..... | ..... | ..... |
| December | 16·21 | 15·83 | 16·01 | 4 | 7 | ..... | ..... | ..... |
| January | 15·33 | 10·12 | 13·23 | 8 | 8 | ..... | ..... | ..... |
| February | 17·95 | 15·51 | 16·79 | 2 | 6 | ..... | ..... | ..... |
| March | 18·31 | 17·10 | 17·70 | 0 | 5 | ..... | ..... | ..... |
| April | 17·71 | 16·89 | 17·42 | 0 | 5 | ..... | ..... | ..... |
| May | 18·17 | 17·33 | 17·74 | 0 | 6 | ..... | ..... | ..... |
| June | 18·47 | 17·71 | 18·13 | 0 | 6 | ..... | ..... | ..... |
| | | | | 16 | 68 | | | |
| St. John— | | | | | | | | |
| July | 16·90 | 15·96 | 16·63 | 1 | 6 | ..... | ..... | 27·73 |
| August | 16·64 | 15·90 | 16·42 | 1 | 6 | ..... | ..... | ..... |
| September | 17·34 | 16·34 | 16·76 | 0 | 5 | ..... | ..... | 24·76 |
| October | 17·21 | 16·70 | 16·90 | 0 | 5 | 25·69 | 21·35 | 23·52 |
| November | 17·28 | 16·49 | 16·91 | 0 | 5 | 25·14 | 24·04 | 24·59 |
| December | 17·52 | 16·52 | 17·08 | 0 | 6 | 23·46 | 21·07 | 22·26 |
| January | 17·57 | 16·51 | 17·25 | 0 | 6 | 24·06 | 23·92 | 23·99 |
| February | 18·87 | 17·51 | 18·08 | 0 | 6 | 26·42 | 25·25 | 25·84 |
| March | 17·82 | 16·97 | 17·48 | 0 | 6 | 22·56 | 20·05 | 21·30 |
| April | 17·53 | 16·28 | 16·86 | 0 | 5 | 26·04 | 23·85 | 24·94 |
| May | 18·53 | 16·61 | 17·38 | 0 | 5 | 26·95 | 21·08 | 24·01 |
| June | 17 83 | 16·92 | 17·30 | 0 | 5 | 24·46 | 22·73 | 23·59 |
| | | | | 2 | 66 | | | |
| Moncton— | | | | | | | | |
| July | ..... | ..... | 21·70 | 0 | 1 | ..... | ..... | ..... |
| August | ..... | ..... | 19·07 | 0 | 1 | ..... | ..... | ..... |
| September | ..... | ..... | 20·40 | 0 | 1 | ..... | ..... | ..... |
| October | ..... | ..... | 19·20 | 0 | 1 | ..... | ..... | ..... |
| November | ..... | ..... | 18·57 | 0 | 1 | ..... | ..... | ..... |
| December | ..... | ..... | 19·35 | 0 | 1 | ..... | ..... | ..... |
| January | ..... | ..... | 18·55 | 0 | 1 | ..... | ..... | ..... |
| February | ..... | ..... | 18 30 | 0 | 1 | ..... | ..... | ..... |
| March | ..... | ..... | 17·28 | 0 | 1 | ..... | ..... | ..... |
| April | ..... | ..... | 16·96 | 0 | 1 | ..... | ..... | ..... |
| May | ..... | ..... | 16·49 | 0 | 1 | ..... | ..... | ..... |
| June | ..... | ..... | 19·00 | 0 | 1 | ..... | ..... | ..... |
| | | | | 0 | 12 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet. 35 Grains. | | Ammonia per 100 Cubic Feet. Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. Grains. | Lowest. Grains. | Average. Grains. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| .... | .... | .... | .... | .... | .... | .... | 4 | 1 | 5 | |
| .... | .... | .... | .... | .... | .... | .... | 5 | 0 | 5 | |
| .... | .... | .... | .... | .... | .... | .... | 5 | 0 | 5 | |
| .... | .... | .... | .... | .... | .... | .... | 4 | 1 | 5 | |
| .... | .... | .... | .... | .... | .... | .... | 4 | 1 | 5 | |
| .... | .... | .... | .... | .... | .... | .... | 3 | 4 | 7 | |
| .... | .... | .... | .... | .... | .... | .... | 6 | 2 | 8 | |
| .... | .... | .... | .... | .... | .... | .... | 6 | 0 | 6 | |
| .... | .... | .... | .... | .... | .... | .... | 4 | 1 | 5 | |
| .... | .... | .... | .... | .... | .... | .... | 5 | 0 | 5 | |
| .... | .... | .... | .... | .... | .... | .... | 6 | 0 | 6 | |
| .... | .... | .... | .... | .... | .... | .... | 6 | 0 | 6 | |
| | | | | | | | 58 | 10 | 68 | |
| 0 | 1 | .... | .... | 0·00 | 0 | 1 | 6 | 0 | 6 | |
| .... | 0 | .... | .... | .... | .... | 0 | 6 | 0 | 6 | |
| 0 | 1 | .... | .... | 1·67 | 0 | 1 | 5 | 0 | 5 | |
| 0 | 2 | 1·01 | 0·65 | 0·83 | 0 | 2 | 5 | 0 | 5 | |
| 0 | 2 | 1·27 | 1·01 | 1·14 | 0 | 2 | 5 | 0 | 5 | |
| 0 | 2 | 2·02 | 1·78 | 1·90 | 0 | 2 | 6 | 0 | 6 | |
| 0 | 2 | 1·09 | 0·00 | 0·54 | 0 | 2 | 6 | 0 | 6 | |
| 0 | 2 | 0·56 | 0·00 | 0·28 | 0 | 2 | 6 | 0 | 6 | |
| 0 | 2 | 1·00 | 0·65 | 0·82 | 0 | 2 | 6 | 0 | 6 | |
| 0 | 2 | 1·60 | 1·13 | 1·36 | 0 | 2 | 5 | 0 | 5 | |
| 0 | 2 | 1·76 | 1·27 | 1·51 | 0 | 2 | 5 | 0 | 5 | |
| 0 | 2 | 1·53 | 1·26 | 1·39 | 0 | 2 | 5 | 0 | 5 | |
| 0 | 20 | | | | 0 | 20 | 66 | 0 | 66 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| .... | .... | .... | .... | .... | .... | .... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |

## APPENDIX

### RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. | | | | | SULPHUR PER 100 ALLOWANCE, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Halifax— | | | | | | | | |
| July | .... | .... | 17·35 | 0 | 1 | .... | .... | 17·95 |
| August | .... | .... | 17·48 | 0 | 1 | .... | .... | 10·25 |
| September | .... | .... | 17·23 | 0 | 1 | .... | .... | 11·28 |
| October | .... | .... | 16·56 | 0 | 1 | .... | .... | 11·55 |
| November | .... | .... | 16·84 | 0 | 1 | .... | .... | 10·98 |
| December | .... | .... | 17·73 | 0 | 1 | .... | .... | 22·00 |
| January | .... | .... | 16·26 | 0 | 1 | .... | .... | 16·66 |
| February | .... | .... | 16·68 | 0 | 1 | .... | .... | 15·30 |
| March | .... | .... | 18·19 | 0 | 1 | .... | .... | 11·90 |
| April | .... | .... | 17·65 | 0 | 1 | .... | .... | 13·24 |
| May | .... | .... | 18·53 | 0 | 1 | .... | .... | 13·04 |
| June | .... | .... | 17·80 | 0 | 1 | .... | .... | 12·44 |
| | | | | 0 | 12 | | | |
| Pictou— | | | | | | | | |
| July | .... | .... | 18·08 | 0 | 1 | .... | .... | .... |
| August | .... | .... | .... | .... | .... | .... | .... | .... |
| September | .... | .... | 17·74 | 0 | 1 | .... | .... | .... |
| October | .... | .... | 17·21 | 0 | 1 | .... | .... | .... |
| November | .... | .... | 18·40 | 0 | 1 | .... | .... | .... |
| December | .... | .... | 18·00 | 0 | 1 | .... | .... | .... |
| January | .... | .... | 17·71 | 0 | 1 | .... | .... | .... |
| February | .... | .... | 18·41 | 0 | 1 | .... | .... | .... |
| March | .... | .... | 17·76 | 0 | 1 | .... | .... | .... |
| April | .... | .... | 17·99 | 0 | 1 | .... | .... | .... |
| May | .... | .... | 18·03 | 0 | 1 | .... | .... | .... |
| June | .... | .... | 18·90 | 0 | 1 | .... | .... | .... |
| | | | | 0 | 11 | | | |
| Yarmouth— | | | | | | | | |
| July | .... | .... | 19·12 | 0 | 1 | .... | .... | .... |
| August | .... | .... | 18·63 | 0 | 1 | .... | .... | .... |
| September | .... | .... | 18·63 | 0 | 1 | .... | .... | .... |
| October | .... | .... | 18·09 | 0 | 1 | .... | .... | .... |
| November | .... | .... | 17·70 | 0 | 1 | .... | .... | .... |
| December | .... | .... | 17·87 | 0 | 1 | .... | .... | .... |
| January | .... | .... | 17·78 | 0 | 1 | .... | .... | .... |
| February | .... | .... | 18·75 | 0 | 1 | .... | .... | .... |
| March | .... | .... | 18·10 | 0 | 1 | .... | .... | .... |
| April | .... | .... | .... | .... | .... | .... | .... | .... |
| May | .... | .... | 18·49 | 0 | 1 | .... | .... | .... |
| June | .... | .... | 18·45 | 0 | 1 | .... | .... | .... |
| | | | | 0 | 11 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| CUBIC FEET 35 GRAINS. | | AMMONIA PER 100 CUBIC FEET—ALLOWANCE, 4 GRAINS. | | | | | SULPHURETTED HYDROGEN. | | | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·40 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 1 | ... | ... | 0·00 | 0 | 1 | 1 | 0 | 1 | |
| 0 | 12 | | | | 0 | 12 | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 11 | 0 | 11 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 11 | 0 | 11 | |

## APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. Highest. | Lowest. | Average. | No. of times below Standard. | No. of Tests. | SULPHER PER 100 ALLOWANCE, Highest | Lowest. | Average |
|---|---|---|---|---|---|---|---|---|
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| Charlottetown— | | | | | | | | |
| July | ... | ... | 17·93 | 0 | 1 | ... | ... | ... |
| August | ... | ... | 18·86 | 0 | 1 | ... | ... | ... |
| September | ... | ... | 21·44 | 0 | 1 | ... | ... | ... |
| October | ... | ... | 17·56 | 0 | 1 | ... | ... | ... |
| November | 19·85 | 17·35 | 18·60 | 0 | 2 | ... | ... | ... |
| December | ... | ... | 17·76 | 0 | 1 | ... | ... | ... |
| January | ... | ... | 17·35 | 0 | 1 | ... | ... | ... |
| February | ... | ... | 17·36 | 0 | 1 | ... | ... | ... |
| March | ... | ... | 18·33 | 0 | 1 | ... | ... | ... |
| April | ... | ... | 16·84 | 0 | 1 | ... | ... | ... |
| May | 16·27 | 15·73 | 16·00 | 1 | 2 | ... | ... | ... |
| June | ... | ... | 16·98 | 0 | 1 | ... | ... | ... |
| | | | | 1 | 14 | | | |
| Winnipeg— | | | | | | | | |
| July | ... | ... | 19·71 | 0 | 1 | ... | ... | ... |
| August | ... | ... | 20·50 | 0 | 1 | ... | ... | ... |
| September | ... | ... | 20·52 | 0 | 1 | ... | ... | ... |
| October | ... | ... | 18·75 | 0 | 1 | ... | ... | ... |
| November | ... | ... | 18·60 | 0 | 1 | ... | ... | ... |
| December | ... | ... | 19·63 | 0 | 1 | ... | ... | ... |
| January | ... | ... | 17·56 | 0 | 1 | ... | ... | ... |
| February | ... | ... | 19·53 | 0 | 1 | ... | ... | ... |
| March | ... | ... | 17·11 | 0 | 1 | ... | ... | ... |
| April | ... | ... | 18·41 | 0 | 1 | ... | ... | ... |
| May | ... | ... | 17·49 | 0 | 1 | ... | ... | ... |
| June | ... | ... | 19·67 | 0 | 1 | ... | ... | ... |
| | | | | 0 | 12 | | | |
| Nanaimo— | | | | | | | | |
| July | ... | ... | 18·64 | 0 | 1 | ... | ... | ... |
| August | ... | ... | 18·41 | 0 | 1 | ... | ... | ... |
| September | ... | ... | 18·83 | 0 | 1 | ... | ... | ... |
| October | ... | ... | 18·39 | 0 | 1 | ... | ... | ... |
| November | ... | ... | 18·78 | 0 | 1 | ... | ... | ... |
| December | ... | ... | 19·02 | 0 | 1 | ... | ... | ... |
| January | ... | ... | 18·61 | 0 | 1 | ... | ... | ... |
| February | ... | ... | 18·73 | 0 | 1 | ... | ... | ... |
| March | ... | ... | 17·86 | 0 | 1 | ... | ... | ... |
| April | ... | ... | 18·02 | 0 | 1 | ... | ... | ... |
| May | ... | ... | 18·92 | 0 | 1 | ... | ... | ... |
| June | ... | ... | 18·78 | 0 | 1 | ... | ... | ... |
| | | | | 0 | 12 | | | |

F—*Continued.*

Inspected during the Year ended June 30, 1903.

| CUBIC FEET. 35 GRAINS. | | AMMONIA PER 100 CUBIC FEET—ALLOWANCE, 4 GRAINS. | | | | | SULPHERETTED HYDROGEN. | | | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 1 | 2 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 2 | 0 | 2 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| | | | | | | | 13 | 1 | 14 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| ...... | ...... | ...... | ...... | ...... | ...... | ...... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |

APPENDIX

RETURN of the Illuminating Power and Purity of Gas

| INSPECTION OFFICES. | ILLUMINATING POWER—STANDARD, 16 CANDLES. | | | | | SULPHUR PER 100 ALLOWANCE, | | |
|---|---|---|---|---|---|---|---|---|
| | Highest. | Lowest. | Average. | No. of times below standard. | No. of Tests. | Highest | Lowest. | Average |
| | Candles. | Candles. | Candles. | | | Grains. | Grains. | Grains. |
| New Westminster— | | | | | | | | |
| July | .... | .... | 19·27 | 0 | 1 | .... | .... | .... |
| August | .... | .... | 18·77 | 0 | 1 | .... | .... | .... |
| September | .... | .... | 18·38 | 0 | 1 | .... | .... | .... |
| October | .... | .... | 18·42 | 0 | 1 | .... | .... | .... |
| November | .... | .... | 19·27 | 0 | 1 | .... | .... | .... |
| December | .... | .... | 19·00 | 0 | 1 | .... | .... | .... |
| January | .... | .... | 19·02 | 0 | 1 | .... | .... | .... |
| February | .... | .... | 19·23 | 0 | 1 | .... | .... | .... |
| March | .... | .... | 19·21 | 0 | 1 | .... | .... | .... |
| April | .... | .... | 19·36 | 0 | 1 | .... | .... | .... |
| May | .... | .... | 19·39 | 0 | 1 | .... | .... | .... |
| June | .... | .... | 18·96 | 0 | 1 | .... | .... | .... |
| | | | | 0 | 12 | | | |
| Vancouver— | | | | | | | | |
| July | .... | .... | 18·20 | 0 | 1 | .... | .... | .... |
| August | .... | .... | 18·02 | 0 | 1 | .... | .... | .... |
| September | .... | .... | 17·90 | 0 | 1 | .... | .... | .... |
| October | .... | .... | 18·05 | 0 | 1 | .... | .... | .... |
| November | .... | .... | 17·95 | 0 | 1 | .... | .... | .... |
| December | .... | .... | 17·50 | 0 | 1 | .... | .... | .... |
| January | .... | .... | 17·00 | 0 | 1 | .... | .... | .... |
| February | .... | .... | 18·06 | 0 | 1 | .... | .... | .... |
| March | .... | .... | 17·80 | 0 | 1 | .... | .... | .... |
| April | .... | .... | 17·90 | 0 | 1 | .... | .... | .... |
| May | .... | .... | 18·45 | 0 | 1 | .... | .... | .... |
| June | .... | .... | 18·35 | 0 | 1 | .... | .... | .... |
| | | | | 0 | 12 | | | |
| Victoria— | | | | | | | | |
| July | .... | .... | 18·33 | 0 | 1 | .... | .... | .... |
| August | .... | .... | 18·21 | 0 | 1 | .... | .... | .... |
| September | .... | .... | 18·17 | 0 | 1 | .... | .... | .... |
| October | .... | .... | 18·02 | 0 | 1 | .... | .... | .... |
| November | .... | .... | 18·11 | 0 | 1 | .... | .... | .... |
| December | .... | .... | 18·07 | 0 | 1 | .... | .... | .... |
| January | .... | .... | 18·26 | 0 | 1 | .... | .... | .... |
| February | .... | .... | 18·01 | 0 | 1 | .... | .... | .... |
| March | .... | .... | 18·24 | 0 | 1 | .... | .... | .... |
| April | .... | .... | 18·17 | 0 | 1 | .... | .... | .... |
| May | .... | .... | 18·10 | 0 | 1 | .... | .... | .... |
| June | .... | .... | 17·34 | 0 | 1 | .... | .... | .... |
| | | | | 0 | 12 | | | |

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

F—*Concluded.*

Inspected during the Year ended June 30, 1903.

| Cubic Feet—35 Grains. | | Ammonia per 100 Cubic Feet—Allowance, 4 Grains. | | | | | Sulphuretted Hydrogen. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of times in excess of allowance. | No. of Tests. | Highest. | Lowest. | Average. | No. of times in excess of allowance. | No. of Tests. | No. of times absent. | No. of times present. | No. of Tests. | |
| | | Grains. | Grains. | Grains. | | | | | | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| ... | ... | ... | ... | ... | ... | ... | 1 | 0 | 1 | |
| | | | | | | | 12 | 0 | 12 | |

W. J. GERALD,
*Deputy Minister,*

# APPENDIX G

STATEMENT of Gas Meters presented for Verification, Verified, Verified after first Rejection and Rejected during the Year ended June 30, 1903.

| Inspection Offices. | Presented for Verification | Kind. | | Verified as coming within the Error tolerated by Law. | | | Verified after first Rejection. | | | Rejected. | | | Totals, Verified and Rejected. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Wet. | Dry. | Correct. | Fast. | Slow. | Correct. | Fast. | Slow. | Unsound. | Fast. | Slow. | Verified. | Rejected. |
| Barrie | 98 | .... | 98 | 2 | 57 | 36 | .... | .... | 1 | .... | .... | 2 | 96 | 2 |
| Belleville | 32 | .... | 32 | 16 | 6 | 10 | .... | .... | .... | .... | .... | .... | 32 | .... |
| Berlin | 223 | .... | 223 | 10 | 133 | 71 | .... | 2 | 3 | 1 | 2 | 1 | 219 | 4 |
| Brockville | 199 | .... | 199 | 44 | 43 | 112 | .... | .... | .... | .... | .... | .... | 199 | .... |
| Cobourg | 109 | .... | 109 | 7 | 37 | 62 | .... | .... | .... | .... | 1 | 2 | 106 | 3 |
| Cornwall | 20 | .... | 20 | 12 | 3 | 5 | .... | .... | .... | .... | .... | .... | 20 | .... |
| Guelph | 144 | .... | 144 | 3 | 58 | 77 | .... | 1 | 1 | 1 | 1 | 2 | 140 | 4 |
| Kingston | 268 | .... | 268 | 86 | 19 | 163 | .... | .... | .... | .... | .... | .... | 268 | .... |
| Hamilton | 1,930 | .... | 1,930 | 414 | 314 | 1,186 | .... | .... | .... | 2 | 14 | .... | 1,914 | 16 |
| Listowel | 23 | .... | 23 | 8 | 6 | 8 | .... | .... | .... | .... | 1 | .... | 22 | 1 |
| London | 2,248 | .... | 2,248 | 582 | 471 | 1,183 | .... | .... | .... | .... | 7 | 5 | 2,236 | 12 |
| Napanee | 28 | .... | 28 | 7 | 17 | 2 | .... | .... | .... | 1 | 1 | .... | 26 | 2 |
| Ottawa | 418 | .... | 418 | 34 | 37 | 344 | .... | .... | .... | .... | 2 | 1 | 415 | 3 |
| Owen Sound | 83 | .... | 83 | 82 | .... | 1 | .... | .... | .... | .... | .... | .... | 83 | .... |
| Peterborough | 73 | .... | 73 | 17 | 3 | 23 | 12 | 14 | 4 | .... | .... | .... | 73 | .... |
| Sarnia | 209 | .... | 209 | 199 | 1 | 7 | .... | .... | .... | .... | .... | 2 | 207 | 2 |
| Stratford | 109 | .... | 109 | 22 | 50 | 31 | .... | .... | .... | .... | 2 | 4 | 103 | 6 |
| Toronto | 7,313 | .... | 7,313 | 958 | 2,433 | 3,880 | .... | .... | .... | 18 | 13 | 11 | 7,271 | 42 |
| Montreal | 7,663 | .... | 7,663 | 685 | 929 | 5,988 | 2 | 10 | 5 | 5 | 27 | 12 | 7,619 | 44 |
| Quebec | 181 | .... | 181 | 34 | 31 | 116 | .... | .... | .... | .... | .... | .... | 181 | .... |
| Sherbrooke | Nil. | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| St. Hyacinthe | 44 | .... | 44 | 43 | .... | .... | .... | .... | .... | .... | 1 | .... | 43 | 1 |
| Fredericton | 34 | .... | 34 | .... | 3 | 27 | .... | .... | .... | 1 | 1 | 2 | 30 | 4 |
| St. John | 256 | .... | 256 | 45 | 13 | 193 | .... | 1 | .... | .... | 2 | 2 | 252 | 4 |
| Halifax | 615 | 46 | 569 | 511 | 62 | 42 | .... | .... | .... | .... | .... | .... | 615 | .... |
| Charlottetown | 27 | .... | 27 | .... | 6 | 8 | .... | 1 | 2 | 5 | 4 | 1 | 17 | 10 |
| Winnipeg | 495 | .... | 495 | 86 | 3 | 406 | .... | .... | .... | .... | .... | .... | 495 | .... |
| Nanaimo | 29 | .... | 29 | 13 | 6 | 10 | .... | .... | .... | .... | .... | .... | 29 | .... |
| New Westminster | 125 | .... | 125 | 17 | 43 | 65 | .... | .... | .... | .... | .... | .... | 125 | .... |
| Vancouver | 107 | .... | 107 | 33 | 14 | 60 | .... | .... | .... | .... | .... | .... | 107 | .... |
| Victoria | 72 | .... | 72 | 20 | 43 | 9 | .... | .... | .... | .... | .... | .... | 72 | .... |
| Totals | 23,175 | 46 | 23,129 | 3.990 | 4,841 | 14,125 | 14 | 29 | 16 | 34 | 79 | 47 | 23,015 | 160 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

# APPENDIX H

STATEMENT of Electric Light Expenditures and Receipts for the Year ended June 30, 1902.

| Districts. | Inspectors. | Expenditures. | | | | | Receipts. | |
|---|---|---|---|---|---|---|---|---|
| | | Salaries. | Special Assistance. | Travelling Expenses. | Sundries. | Totals. | Registration Fees. | Inspection Fees. |
| | | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Belleville | Johnson, Wm. | | | 277 22 | 13 21 | 290 43 | 500 00 | 453 75 |
| Hamilton | McPhie, D. | | | 83 30 | 1 95 | 85 25 | 300 00 | 831 00 |
| London. | Nash, A. F. | | | 142 35 | 51 94 | 194 29 | 540 00 | 991 00 |
| Ottawa. | Roche, H. G. | | | | 2 50 | 2 50 | 310 00 | 3,280 25 |
| Toronto | Johnstone, J. K. | | | 234 38 | 5 25 | 239 63 | 830 00 | 3,372 75 |
| | Ontario. | | | 737 25 | 74 85 | 812 10 | 2,480 00 | 8,928 75 |
| Montreal | Aubin, A. | | 374 00 | 36 65 | 14 25 | 424 90 | 170 00 | 4,950 75 |
| Quebec | Levasseur, N. | | | 4 96 | 69 46 | 74 42 | 140 00 | 899 50 |
| Sherbrooke | Simpson, A. F | | | 63 76 | 11 21 | 74 97 | 170 00 | 162 25 |
| St. Hyacinthe | Provost, J. E. | 300 00 | | 46 90 | 1 30 | 348 20 | 130 00 | 265 75 |
| Three Rivers. | Dufresne, J. U. | 458 26 | | 25 40 | 38 47 | 522 13 | 55 00 | 116 50 |
| | Quebec | 758 26 | 374 00 | 177 67 | 134 69 | 1,444 62 | 665 00 | 6,394 75 |
| St. John | Wilson, J. E | | | 133 20 | 4 38 | 137 58 | 140 00 | 1,059 25 |
| Halifax | Miller, A. | | | 244 00 | 2 75 | 246 75 | 305 00 | 731 50 |
| Charlottetown | Bell, J. H | | | 7 30 | 23 23 | 30 53 | 40 00 | 124 75 |
| Winnipeg | Magness, R. | | | | | | 230 00 | 704 75 |
| Vancouver. | Miller, J. E | | | | | | 230 00 | 1,141 25 |
| Victoria | Jones, R | | | 38 90 | 9 25 | 48 15 | 65 00 | 654 75 |
| | Br. Columbia | | | 38 90 | 9 25 | 48 15 | 295 00 | 1,796 00 |

RECAPITULATION.

| | Salaries. | Special Assistance. | Travelling Expenses. | Sundries. | Totals. | Registration Fees. | Inspection Fees. |
|---|---|---|---|---|---|---|---|
| Ontario | | | 737 25 | 74 85 | 812 10 | 2.480 00 | 8,928 75 |
| Quebec | 758 26 | 374 00 | 177 67 | 134 69 | 1.444 62 | 665 00 | 6,394 75 |
| New Brunswick | | | 133 20 | 4 38 | 137 58 | 140 00 | 1.059 25 |
| Nova Scotia | | | 244 00 | 2 75 | 246 75 | 305 00 | 731 50 |
| Prince Edward Island | | | 7 30 | 23 23 | 30 53 | 40 00 | 124 75 |
| Manitoba | | | | | | 230 00 | 704 75 |
| British Columbia | | | 38 90 | 9 25 | 48 15 | 295 00 | 1.796 00 |
| Chief Electrical Engineer's Office | 2.764 19 | | 191 86 | 176 37 | 3,132 42 | | |
| General | | | | 1,939 05 | 1,939 05 | | |
| Printing | | | | 689 55 | 689 55 | | |
| Stationery | | | | 19 99 | 19 99 | | |
| Totals. | 3,522 45 | 374 00 | 1,530 18 | 3,074 11 | 8.500 74 | 4.155 00 | 19,739 75 |

N.B.—Refund of $15 to be deducted from Registration Fees. (See Statement No. 16. part I, page 47).

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

# APPENDIX I.

STATEMENT showing the number of Electric Light Meters Verified, Rejected and Verified after first Rejection, in each Inspection District, for the Fiscal Year ended June 30, 1903.

| Districts. | Number presented. | Verified as coming within the error tolerated by law. | | | Rejected. | | | Verified after first Rejection. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Correct. | Fast. | Slow. | Unsound. | Fast. | Slow. | Correct. | Fast. | Slow. |
| Belleville | 341 | 151 | 83 | 107 | .... | .... | .... | .... | .... | .. |
| Hamilton | 663 | 229 | 200 | 234 | .... | .... | .... | .... | .... | .... |
| London | 808 | 246 | 241 | 312 | .... | 1 | .... | .... | 1 | 7 |
| Ottawa | 3,854 | 223 | 428 | 3,185 | 15 | 1 | 2 | .... | .... | .... |
| Toronto | 1,943 | 432 | 729 | 735 | .... | 16 | 31 | .... | .... | .... |
| Montreal | 3,678 | 2,219 | 1,018 | 400 | 1 | 21 | 3 | 3 | 13 | .... |
| Quebec | 969 | 306 | 610 | 53 | .... | .... | .... | .... | .... | .... |
| Sherbrooke | 148 | 44 | 36 | 63 | .... | .... | 5 | .... | .... | .... |
| St. Hyacinthe | 212 | 211 | .... | .... | 1 | .... | .... | .... | .... | .... |
| Three Rivers | 60 | 25 | 13 | 22 | .. | .... | .... | .... | .... | .... |
| St. John | 673 | 243 | 178 | 249 | .... | 3 | .... | .... | .... | .... |
| Halifax | 727 | 568 | 75 | 57 | 1 | 17 | 5 | 4 | .... | .... |
| Charlottetown | 86 | 19 | 25 | 41 | .... | 1 | .... | .... | .... | .... |
| Winnipeg | 633 | 333 | 75 | 225 | .... | .... | .... | .... | | .... |
| Vancouver | 1,105 | 89 | 16 | 1,000 | .... | .... | .... | .... | .... | .... |
| Victoria | 185 | 60 | 45 | 80 | .... | .... | .... | .... | .... | .... |
| Totals | 16,085 | 5,398 | 3,772 | 6,763 | 18 | 60 | 46 | 7 | 14 | 7 |

W. J. GERALD,
*Deputy Minister.*

INLAND REVENUE DEPARTMENT,
OTTAWA, August 18, 1903.

# APPENDIX J.

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the Year ended June 30, 1903.

| Districts. | From whom Collected. | Serial No. | By whom Collected. | Certificate for Fiscal Year. | Number of Lamps. Arc. | Number of Lamps. Incandescent. | Number of Lamps. Totals. | Registration Fees. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | $ cts. | $ cts. |
| Belleville | Marmora Electric Co. | 1 | C. I. R., Belleville | 1902 1903. | | 457 | 457 | 5 00 | |
| | Corporation of the town of Picton | 2 | " " | " | 66 | 3,000 | 3,660 | 25 00 | |
| | Trenton Electric and Water Co., Ltd. | 3 | " " | " | 68 | 7,285 | 7,965 | 25 00 | |
| | Frankford Electric Light Co., Ltd | 4 | " " | " | | 199 | 199 | 5 00 | |
| | H. L. Eggleton, Madoc | 5 | " " | " | | 430 | 430 | 5 00 | |
| | Steinhoff & Gordon, Tweed. | 6 | " " | " | | 850 | 850 | 10 00 | |
| | Vankleek Hill Electric Co., Ltd | 1 | " Cornwall | " | | 1,132 | 1,132 | 10 00 | |
| | Corporation of Alexandria | 2 | " " | " | | 988 | 988 | 10 00 | |
| | Stormont Electric Light and Power Co. | 3 | " " | " | | 1,350 | 1,350 | 10 00 | |
| | M. P. Davis, Mille Roches | 4 | " " | " | 230 | 192 | 2,492 | 25 00 | |
| | Kingston Light, Heat and Power Co | 1 | " Kingston | " | 115 | 2,900 | 4,050 | 25 00 | |
| | Benjamin Manufacturing Co. of Yarker, Ltd | 2 | " " | " | | 250 | 250 | 5 00 | |
| | A. A. Connelly, Yarker | 3 | " " | " | | 134 | 134 | 5 00 | |
| | Napanee Water and Electric Light Co., Ltd. | 4 | " " | " | 24 | 2,401 | 2,641 | 25 00 | |
| | Bowmanville Electric Light Co., Ltd | 1 | " Peterborough | " | 17 | 1,375 | 1,545 | 10 00 | |
| | Port Hope Electric Light and Power Co., Ltd. | 2 | " " | " | 36 | 1,000 | 1,360 | 10 00 | |
| | Cobourg Water and Electric Co., Ltd | 3 | " " | " | 24 | 2,000 | 2,240 | 25 00 | |
| | Brighton Electric Light Plant | 4 | " " | " | | 600 | 600 | 10 00 | |
| | Lakefield Light and Power Co | 5 | " " | " | 10 | 70 | 170 | 5 00 | |
| | H. W. Foulds & Co., Hastings | 6 | " " | " | 12 | 479 | 599 | 10 00 | |
| | W. C. Harrison, Norwood | 7 | " " | " | 17 | 490 | 660 | 10 00 | |
| | Light, Heat and Power Co. of Lindsay, Ltd. | 8 | " " | " | | 7,000 | 7,000 | 25 00 | |
| | Colborne Electric Light Co. | 9 | " " | " | 20 | 600 | 800 | 10 00 | |
| | Waterworks and Electric Light Commission, Campbellford. | 10 | " " | " | 36 | 1,440 | 1,800 | 10 00 | |
| | Peterborough Light and Power Co., Ltd | 11 | " " | " | 110 | 8,000 | 9,100 | 25 00 | |
| | H. R. Carruthers, Millbrook | 12 | " " | " | 6 | 444 | 504 | 10 00 | |
| | McDougall, Brandon and Austin, Fenelon Falls. | 13 | " " | " | | 700 | 700 | 10 00 | |
| | D. J. Galbraith, Newcastle | 14 | " " | " | | 450 | 450 | 5 00 | |
| | Auburn Power Co., Ltd., Peterborough | 15 | " " | " | | 420 | 420 | 5 00 | |
| | Otonabee Power Co., Ltd., Peterborough | 16 | " " | " | | 400 | 400 | 5 00 | |
| | Belmont Gold Mine, Ltd | 17 | " " | " | 1 | 349 | 359 | 5 00 | |
| | Water and Light Commissioners, Prescott | 1 | " Prescott | " | 8 | 2,376 | 2,456 | 25 00 | |

## APPENDIX J—*Continued.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the Year ended June 30, 1903.

| Districts. | From whom Collected. | Serial No. | By whom Collected. | Certificate for fiscal year. | Number of Lamps. Arc. | Number of Lamps. Incandescent. | Number of Lamps. Totals. | Registration Fees. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | $ cts. | $ cts. |
| Belleville | Brockville Light and Power Department | 2 | C. I. R., Prescott | 1901 1903 | 42 | 3,700 | 4,120 | 25 00 | |
| | Cardinal Electric Light Co., Ltd | 3 | " " | " | | 700 | 700 | 10 00 | |
| | Kemptville Electric Light Co | 4 | " " | " | | 850 | 850 | 10 00 | |
| | Gananoque Electric Light and Water Supply Co., Ltd | 5 | " " | " | 21 | 1,000 | 1,210 | 10 00 | |
| | Morrisburg Electric Light Works | 6 | " " | " | | 2,250 | 2,250 | 25 00 | |
| | Merrickville Electric Light and Power Co | 7 | " " | " | | 400 | 400 | 5 00 | |
| | Municipality of Iroquois | 8 | " " | " | 12 | 588 | 700 | 10 00 | 500 00 |
| Hamilton | Brantford Electric and Operating Co., Ltd | 1 | " Brantford | " | 150 | 8,000 | 9,500 | 25 00 | |
| | Brantford Street Railway Co | 2 | " " | " | 1 | 3,589 | 3,599 | 25 00 | |
| | Municipality of Paris | 3 | " " | " | 26 | 725 | 985 | 10 00 | |
| | Simcoe Gas and Water Co., Ltd | 4 | " " | " | 30 | | 300 | 5 00 | |
| | Herbert Webster, Norwich | 5 | " " | " | | 750 | 750 | 10 00 | |
| | Tilsonburg Electric Light Works | 6 | " " | " | 5 | 900 | 950 | 10 00 | |
| | Woodstock Water and Light Works | 7 | " " | " | 78 | 1,200 | 1,980 | 10 00 | |
| | Port Dover Electric Co | 8 | " " | " | | 300 | 300 | 5 00 | |
| | Port Rowan Electric Light and Supply | 9 | " " | " | 9 | 160 | 250 | 5 00 | |
| | James Munro, Embro | 10 | " " | " | | 465 | 465 | 5 00 | |
| | Ingersoll Electric Power and Light Co., Ltd | 11 | " " | " | 37 | 1,542 | 1,912 | 10 00 | |
| | Hamilton Electric Light and Cataract Power Co., Ltd | 1 | " Hamilton | " | | 200 | 200 | 5 00 | |
| | Hamilton Electric Light and Power Co., Ltd | 2 | " " | " | 700 | 42,000 | 49.000 | 25 00 | |
| | Electrical Power and Manufacturing Co., Ltd., Hamilton | 3 | " " | " | | 200 | 200 | 5 00 | |
| | Dundas Electric Co., Ltd | 4 | " " | " | 6 | 860 | 920 | 10 00 | |
| | Maple Leaf Rubber Co., Ltd., Port Dalhousie | 1 | " St. Catharines | " | 16 | 438 | 598 | 10 00 | |
| | Town of Thorold | 2 | " " | " | 26 | 960 | 1,220 | 25 00 | |
| | Lincoln Electric Light and Power Co., Ltd | 3 | " " | " | 79 | 5,000 | 5,790 | 25 00 | |
| | Dunnville Electric Light Co., Ltd | 4 | " " | " | 20 | 870 | 1,070 | 10 00 | |
| | Town of Niagara | 5 | " " | " | | 750 | 750 | 10 00 | |
| | Town of Niagara Falls | 6 | " " | " | 600 | 3,000 | 9,000 | 25 00 | |
| | Ontario Electric Light and Power Co., Ltd., Beamsville | 7 | " " | " | | 400 | 400 | 5 00 | |
| | J. W. Van Dyke, Grimsby | 8 | " " | " | | 800 | 800 | 10 00 | |
| | Welland Electric Light Co | 9 | " " | " | 18 | 300 | 480 | 5 00 | |
| | Merriton Electric Light Co | 10 | " " | " | 21 | 700 | 910 | 10 00 | 300 00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| London | London Electric Co., Ltd | 1 | C. I. R., London | " | 360 | 21,500 | 28,100 | 25 00 | |
| | St. Thomas Gas Co | 2 | " " | " | 87 | 1,500 | 2,370 | 25 00 | |
| | Strathroy Electric Co., Ltd. | 3 | " " | " | 18 | 650 | 830 | 10 00 | |
| | H. C. Baird & Son, Parkhill | 4 | " " | " | 17 | 750 | 870 | 10 00 | |
| | Hamilton & Pront, Forest | 5 | " " | " | 12 | 588 | 708 | 10 00 | |
| | Cook & Sons, Lucan | 6 | " " | " | ..... | 600 | 600 | 10 00 | |
| | Fitzgerald and Sauermann, Watford | 7 | " " | " | 13 | 350 | 480 | 5 00 | |
| | Alviston Electric Light Plant | 8 | " " | " | 13 | 200 | 330 | 5 00 | |
| | Sarnia Gas & Electric Light Co | 9 | " " | " | 75 | 1,200 | 1,950 | 10 00 | |
| | Town of Aylmer | 10 | " " | " | 12 | 800 | 920 | 10 00 | |
| | West Lorne Electric Light Co., Ltd | 11 | " " | " | 6 | 247 | 307 | 5 00 | |
| | Petrolia Electric Light, Heat and Power Co., Ltd. | 12 | " " | " | 41 | 2,306 | 2,716 | 25 00 | |
| | E. I. Sifton, London | 13 | " " | " | 13 | 1,500 | 1,630 | 10 00 | |
| | Dutton Electric Light Co., Ltd | 14 | " " | " | 4 | 500 | 540 | 10 00 | |
| | Bella A. Gordon, Glencoe | 15 | " " | " | 28 | 350 | 630 | 10 00 | |
| | Town of Goderich | 1 | C. I. R., Stratford | " | 33 | 2,000 | 2,330 | 25 00 | |
| | Seaforth Electric Light, Heat and Power Co., Ltd. | 2 | " " | " | 46 | 1,400 | 1,860 | 10 00 | |
| | J. L. Eidt, Auburn | 3 | " " | " | .... | 275 | 275 | 5 00 | |
| | J. A. Williams & Co., Zurich | 4 | " " | " | ..... | 285 | 285 | 5 00 | |
| | Stratford Gas Co. | 5 | " " | " | 132 | 3,226 | 4,546 | 25 00 | |
| | Palmerston Electric Light Co., Ltd | 6 | " " | " | 4 | 380 | 420 | 5 00 | |
| | Listowel Gas and Electric Light Co., Ltd. | 7 | " " | " | 25 | .... | 250 | 5 00 | |
| | J. G. Field, Tavistock | 8 | " " | " | ..... | 425 | 125 | 5 00 | |
| | Town of Mitchell | 9 | " " | " | 26 | 550 | 810 | 10 00 | |
| | Clinton Electric Light Co | 10 | " " | " | 14 | 650 | 790 | 10 00 | |
| | Brussels Electric Co | 11 | " " | " | 9 | 450 | 540 | 10 00 | |
| | Conrad Reis, Wroxeter | 12 | " " | " | ..... | 370 | 370 | 5 00 | |
| | Town of St. Mary's | 13 | " " | " | 34 | 1,500 | 1,810 | 10 00 | |
| | Hensall Electric Light Co | 14 | " " | " | 1 | 800 | 810 | 10 00 | |
| | Wingham Electric Light Co | 15 | " " | " | 50 | 1,500 | 2,000 | 25 00 | |
| | Blyth Electric Light Plant | 16 | " " | " | 7 | 500 | 570 | 10 00 | |
| | Tremaine & Snell, Exeter | 17 | " " | " | 10 | 900 | 1,000 | 10 00 | |
| | Hiram Walker & Sons, Ltd. | 1 | C. I. R., Windsor | " | 9 | 3,000 | 3,090 | 25 00 | |
| | Peoples Electric Co., Ltd., Windsor | 2 | " " | " | 9 | 6,578 | 6,668 | 25 00 | |
| | Kingsville Electric Light Co | 3 | " " | " | | 725 | 725 | 10 00 | |
| | Town of Dresden | 4 | " " | " | ..... | 700 | 700 | 10 00 | |
| | James Galloway, Thamesville | 5 | " " | " | ..... | 600 | 600 | 10 00 | |
| | Leamington Electric Light Co., Ltd | 6 | " " | " | 17 | 1,400 | 1,570 | 10 00 | |
| | Town of Bothwell | 7 | " " | " | 15 | 300 | 450 | 5 00 | |
| | Alexander F. Nelson, Tilbury | 8 | " " | " | 13 | 360 | 490 | 5 00 | |
| | W. H. McMackon, Ridgetown | 9 | " " | " | 16 | 950 | 1,110 | 10 00 | |
| | Wallaceburg Electric Light Co., Ltd | 10 | " " | " | 18 | 1,400 | 1,580 | 10 00 | |
| | Amherstburg Electric Heat and Power Co., Ltd. | 11 | " " | " | ..... | 900 | 900 | 10 00 | |
| | Charles E. Naylor, Essex | 12 | " " | " | 7 | 600 | 670 | 10 00 | |
| | Chatham Gas Co., Ltd | 13 | " " | " | 12 | 3,480 | 3,600 | 25 00 | |
| | Town of Blenheim | 14 | " " | " | 13 | 620 | 750 | 10 00 | |
| | | | | | | | | | 540 00 |
| Ottawa | Consumers Electric Co., Ltd., Ottawa | 1 | C. I. R., Ottawa | " | 1 | 578 | 588 | 10 00 | |
| | Albert MacLaren, Buckingham | 2 | " " | " | ..... | 1,500 | 1,500 | 10 00 | |
| | Ottawa Electric Co. | 3 | " " | " | 752 | 104,407 | 111,927 | 25 00 | |

## APPENDIX J.—*Continued.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the Year ended June 30, 1903.

| Districts. | From whom Collected. | Serial No. | By whom Collected. | Certificate for Fiscal Year. | Number of Lamps. | | | Registration Fees. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Arc. | Incandescent. | Totals. | | |
| | | | | | | | | $ cts. | $ cts. |
| | Deschênes Electric Co., Ltd., Ottawa | 4 | " " | 1902-1903 | .... | 2,350 | 2,350 | 25 00 | |
| | Hull Electric Co. | 5 | " " | " | 10 | 4,500 | 4,600 | 25 00 | |
| | Smith's Falls Electric Power Co., Ltd. | 1 | C. I. R., Perth | " | 45 | 3,500 | 3,950 | 25 00 | |
| | Carleton Place Electric Light Co. | 2 | " " | " | 28 | 1,675 | 1,955 | 10 00 | |
| | Arnprior Electric Light and Power Co., Ltd. | 3 | " " | " | .... | 2,700 | 2,700 | 25 00 | |
| | Pakenham Electric Light Co. | 4 | " " | " | .... | 390 | 390 | 5 00 | |
| | Perth Electric Light Co., Ltd | 5 | " " | " | 40 | .... | 400 | 5 00 | |
| | Pembroke Electric Light Co., Ltd | 6 | " " | " | 21 | 3,000 | 3,210 | 25 00 | |
| | Renfrew Electric Co., Ltd. | 7 | " " | " | 8 | 1,226 | 1,306 | 10 00 | |
| | William A. Mackay, Renfrew | 8 | " " | " | .... | 1,000 | 1,000 | 10 00 | |
| | Star Electric Co., Eganville | 9 | " " | " | .... | 1,200 | 1,200 | 10 00 | |
| | Canadian Electric and Water Power Co., Ltd., Perth | 10 | " " | " | .... | 2,400 | 2,400 | 25 00 | |
| | John Bourke, North Bay | 11 | " " | " | 15 | 1,500 | 1,650 | 10 00 | |
| | Mattawa Electric Light and Power Co., Ltd | 12 | " " | " | 13 | 917 | 1,047 | 10 00 | |
| | Sturgeon Falls Electric Light and Power Co., Ltd | 13 | " " | " | .... | 650 | 650 | 10 00 | |
| | Town of Sudbury | 14 | " " | " | .... | 1,563 | 1,563 | 10 00 | |
| | Canadian Copper Co., Copper Cliff | 15 | " " | " | 15 | 305 | 455 | 5 00 | |
| | Citizens Electric Co., Ltd., Smith's Falls | 16 | " " | " | .... | 1,400 | 1,400 | 10 00 | |
| | Town of Almonte | 17 | " " | " | .... | 1,400 | 1,400 | 10 00 | 310 00 |
| Toronto | Guelph Light and Power Co., Ltd | 1 | C. I. R., Guelph | " | 101 | 3,550 | 4,560 | 25 00 | |
| | Corporation of Mount Forest | 2 | " " | " | 14 | 800 | 940 | 10 00 | |
| | Galt Gas Light Co. | 3 | " " | " | 60 | 1,900 | 2,500 | 25 00 | |
| | Berlin Gas Co. | 4 | " " | " | 81 | 1,203 | 2,013 | 25 00 | |
| | Waterloo Electric Light and Power Co | 5 | " " | " | 22 | 1,943 | 2,163 | 25 00 | |
| | W. C. Shearer, Preston | 6 | " " | " | | 600 | 600 | 10 00 | |
| | Geo. Leighton, Harriston | 7 | C. I. R., Guelph | " | 18 | 400 | 580 | 10 00 | |
| | James Fenwick, Preston | 8 | " " | " | 30 | .... | 300 | 5 00 | |
| | Jacob Morley, New Hamburg | 9 | " " | " | 19 | 300 | 490 | 5 00 | |
| | Fergus Electric Light and Milling Co. | 10 | " " | " | 17 | 700 | 870 | 10 00 | |
| | Town of Hespeler | 11 | " " | " | .... | 950 | 950 | 10 00 | |
| | Adams Bros., Dayton | 12 | " " | " | .... | 225 | 225 | 5 00 | |
| | Thos. Andrews, Thornbury | 1 | C. I. R., Owen Sound | " | 10 | 550 | 650 | 10 00 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Minnis Bros., Markdale | 2 | " " | " | .... | 600 | 600 | 10 00 |
| W. Wenger & Bros., Ayton | 3 | " " | " | ..... | 125 | 125 | 5 00 |
| H. Gruetzner, Hanover | 4 | " " | " | 19 | 1,514 | 1,704 | 10 00 |
| Paisley Electric Co. | 5 | " " | " | .... | 730 | 730 | 10 00 |
| Walkerton Electric Light and Power Co., Ltd. | 6 | " " | " | 16 | 1,618 | 1,778 | 10 00 |
| Saugeen Electric Light and Power Co., Ltd., Southampton | 7 | " " | " | .... | 1,638 | 1,638 | 10 00 |
| Canada Furniture Manufacturers, Ltd., Wiarton | 8 | " " | " | 16 | 1,400 | 1,560 | 10 00 |
| Bearman & Co., Chesley | 9 | " " | " | 30 | 900 | 1,200 | 10 00 |
| Kincardine Waterworks and Electric Light | 10 | " " | " | ..... | 910 | 910 | 10 00 |
| Owen Sound Electric Illuminating and Manufacturing Co., Ltd | 11 | " " | " | 45 | 800 | 1,250 | 10 00 |
| Walter Stewart & Son, Lucknow | 12 | " " | " | 12 | 350 | 470 | 5 00 |
| Town of Collingwood | 13 | " " | " | 35 | 3,000 | 3,350 | 25 00 |
| Crawford & McIntyre, Durham | 4 | " " | " | ..... | 950 | 950 | 10 00 |
| W. Moore & Sons, Meaford | 15 | " " | " | 25 | 800 | 1,050 | 10 00 |
| Teeswater Light and Power Co. | 16 | " " | " | .... | 467 | 467 | 5 00 |
| H. Cargill & Sons, Cargill | 17 | " " | " | .... | 400 | 400 | 5 00 |
| Corporation of Village of Dundalk | 18 | " " | " | ... | 500 | 500 | 5 00 |
| Town of Orillia | 1 | C. I. R., Toronto | " | 47 | 3,500 | 3,970 | 25 00 |
| Cataract Electric Co., Erin | 2 | " " | " | .... | 500 | 500 | 10 00 |
| Brampton Electric Co | 3 | " " | " | 30 | 720 | 1,020 | 10 00 |
| Aurora Electric Light Co. | 4 | " " | " | 2 | 500 | 520 | 10 00 |
| Geo. H. Jordan, Whitby | 5 | " " | " | 26 | 551 | 814 | 10 00 |
| Shelburne Electric Light | 6 | " " | " | 25 | 450 | 700 | 10 00 |
| Village of Beeton | 7 | " " | " | ... | 700 | 700 | 10 00 |
| John Philip, Grand Valley | 8 | " " | " | 3 | 700 | 730 | 10 00 |
| Town of Barrie | 9 | " " | " | 53 | 4,000 | 4,530 | 25 00 |
| Alliston Electric Light Co. | 10 | " " | " | 6 | 700 | 760 | 10 00 |
| Midland Electric Co., Ltd | 11 | " " | " | 37 | 1,800 | 2,170 | 25 00 |
| Alex. Dobson, Beaverton | 12 | " " | " | ..... | 525 | 525 | 10 00 |
| Toronto Electric Light Co., Ltd. | 13 | " " | " | 2,000 | 150,000 | 170,000 | 25 00 |
| Orangeville Electric Light and Power Co., Ltd | 14 | " " | " | .... | 1,500 | 1,500 | 10 00 |
| W. H. Summerfeldt & Sons, Sutton | 15 | " " | " | ....... | 400 | 400 | 5 00 |
| I. J. Gould, Uxbridge | 16 | " " | " | 13 | 974 | 1,104 | 10 00 |
| Village of Acton | 17 | " " | " | .. | 950 | 950 | 10 00 |
| Sunderland Electric Power Co., Ltd | 18 | " " | " | .... | 240 | 240 | 5 00 |
| Penetang and Midland Electric Street Railway and Power Co., Ltd. | 19 | " " | " | 15 | 1,100 | 1,250 | 10 00 |
| Simon Plewes, Creemore | 20 | " " | " | ..... | 400 | 400 | 5 00 |
| Knight Brothers Co., Burks Falls | 21 | " " | " | .. | 550 | 550 | 10 00 |
| Town of Bracebridge | 22 | " " | " | ....... | 3,000 | 3,000 | 25 00 |
| Tagona Water and Light Co., Sault Ste. Marie | 23 | " " | " | 146 | 7,336 | 8,796 | 25 00 |
| John Knox, Stayner | 24 | " " | " | ...... | 750 | 750 | 10 00 |
| Georgetown Electric Light and Power Co., Ltd. | 25 | " " | " | 24 | 700 | 940 | 10 00 |
| Town of Newmarket | 26 | " " | " | ..... | 2,100 | 2,100 | 25 00 |
| Robert Fielding, Gravenhurst | 27 | " " | " | ..... | 2,200 | 2,200 | 25 00 |
| Oakville Electric Plant | 28 | " " | " | 26 | 712 | 972 | 10 00 |
| Village of Markham | 29 | " " | " | .... | 500 | 500 | 10 00 |
| Town of Huntsville | 30 | " " | " | .... | 99 | 990 | 10 00 |
| Hamilton Electric Light and Cataract Power Co., Ltd. | 31 | " " | " | | 400 | 400 | 5 00 |

## APPENDIX J *Continued.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the Year ended June 30, 1903.

| Districts. | From whom Collected. | Serial No. | By whom Collected. | Certificate for Fiscal Year. | Number of Lamps. |  |  | Registration Fees. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  | Arc. | Incandescent. | Totals. |  |  |
|  |  |  |  |  |  |  |  | $ cts. | $ cts. |
| Toronto *Con.* | Village of Weston | 32 | C. I. R., Toronto | 1902 1903 | 17 | 458 | 628 | 10 00 |  |
|  | Oshawa Electric Light Co., Ltd. | 33 | " " | " | 11 | 1,300 | 1,410 | 10 00 |  |
|  | Town of Thessalon. | 34 | " " | " | .... | 493 | 493 | 5 00 |  |
|  | William A. Ritchie, Elmvale | 35 | " " | " | ...... | 600 | 600 | 10 00 |  |
|  | Town of Parry Sound | 36 | " " | " | 1 | 2,000 | 2,010 | 25 00 |  |
|  | Village of Toronto East | 37 | " " | " | 24 | 160 | 400 | 5 00 |  |
|  | Milton Electric Light and Power Co., Ltd | 38 | " " | " | 20 | 425 | 625 | 10 00 |  |
|  | W. & A. McArthur Co., Ltd., Little Current | 39 | " " | " | 1 | 88 | 98 | 5 00 |  |
|  | C. V. Currie, Port Perry | 40 | " " | " | 2 | 400 | 420 | 5 00 | 830 00 |
| Montreal. | Beauharnois Electric Light Co | 1 | C. I. R., Montreal | " | ...... | 420 | 420 | 5 00 |  |
|  | Village of Huntingdon | 2 | " " | " | ...... | 850 | 850 | 10 00 |  |
|  | Valleyfield Electric Co., Ltd | 3 | " " | " | 84 | 2,500 | 3,340 | 25 00 |  |
|  | Compangnie d'éclairage Electrique de Terrebonne | 4 | " " | " | .... | 476 | 476 | 5 00 |  |
|  | Jean Roux, Ste. Thérèse de Blainville | 5 | " " | " | .... | 200 | 200 | 5 00 |  |
|  | John T. Ayers, Lachute | 6 | " " | " | ..... | 980 | 980 | 10 00 |  |
|  | Gazette Printing Co., Montreal | 7 | " " | " | ..... | 800 | 800 | 10 00 |  |
|  | St. Jérôme Power and Electric Light Co., Ltd. | 8 | " " | " | .... | 900 | 900 | 10 00 |  |
|  | Lachine Rapids Hydraulic and Land Co., Ltd | 9 | " " | " | 509 | 85,685 | 90,775 | 25 00 |  |
|  | Montreal Light, Heat and Power Co | 10 | " " | " | 2,220 | 136,303 | 158,503 | 25 00 |  |
|  | Lachute Electric Light Co. | 11 | " " | " | .... | 400 | 400 | 5 00 |  |
|  | Town of Lachine | 12 | " " | " | 50 | 1,700 | 2,200 | 25 00 |  |
|  | Laurentian Water and Power Co., Ste. Agathe des Monts | 13 | " " | " | 1 | 1,200 | 1,210 | 10 00 | 170 00 |
| Quebec. | Montmagny Light and Power Co. | 1 | C. I. R., Quebec | " | 3 | 1,600 | 1,630 | 10 00 |  |
|  | M. A. & H. Grandbois, St. Casimir | 2 | " " | " | .... | 300 | 300 | 5 00 |  |
|  | Quebec Jacques Cartier Electric Co. | 3 | " " | " | 153 | 53,000 | 54,530 | 25 00 |  |
|  | Quebec Railway Light and Power Co. | 4 | " " | " | 500 | 45,000 | 50,000 | 25 00 |  |
|  | Fraserville Co., Ltd. | 5 | " " | " | 12 | 1,988 | 2,108 | 25 00 |  |
|  | Canadian Electric Light Co., Levis | 6 | " " | " | ...... | 7,087 | 7,087 | 25 00 |  |
|  | Cie des Eaux et de l'Electricité, Chicoutimi | 7 | " " | " | .... | 2,000 | 2,060 | 10 00 |  |
|  | Compagnie Electrique de Roberval | 8 | " " | " | 1 | 1,424 | 1,434 | 10 00 |  |
|  | Compagnie Electrique de la Baie St. Paul | 9 | " " | " | ..... | 425 | 425 | 5 00 | 140 00 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sherbrooke | Brome Lake Electric Power Co., Waterloo | 1 | C. I. R., Sherbrooke | " | 1 | 1,000 | 1,010 | 10 00 | |
| | Knowlton Electric Light Co | 2 | " " | " | | 400 | 400 | 5 00 | |
| | Richmond County Electric Co., Richmond | 3 | " " | " | | 1,736 | 1,736 | 10 00 | |
| | French Bros., Sawyerville | 4 | " " | " | 1 | 99 | 109 | 5 00 | |
| | Coaticook Electric Light and Power Co. | 5 | " " | " | 28 | 2,000 | 2,280 | 25 00 | |
| | N. P. Tanguay, Weedon | 6 | " " | " | | 500 | 500 | 10 00 | |
| | Village of Granby | 7 | " " | " | 50 | 2,500 | 3,000 | 25 00 | |
| | Eastern Townships Electric Co., North Hatley | 8 | " " | " | | 900 | 900 | 10 00 | |
| | Parker & Howe, Dixville | 9 | " " | " | | 150 | 150 | 5 00 | |
| | Sherbrooke Gas and Water Co | 10 | " " | " | 92 | 11,488 | 12,108 | 25 00 | |
| | D. Champoux & Bros., Disraeli | 11 | " " | " | | 775 | 775 | 10 00 | |
| | Town of Magog | 12 | " " | " | | 1,800 | 1,800 | 10 00 | |
| | Cie. d'Eclairage Electrique de Mégantic, Lac Mégantic | 13 | " " | " | | 940 | 910 | 10 00 | |
| | Thos. Crockett, Danville | 14 | " " | " | | 800 | 800 | 10 00 | |
| | | | | | | | | | 170 00 |
| St. Hyacinthe | Cie. Electrique de Plessisville | 1 | C. I. R., St. Hyacinthe | " | | 1,825 | 1,825 | 10 00 | |
| | M. S. Cornell & Sons, Stanbridge East | 2 | " " | " | | 225 | 225 | 5 00 | |
| | St. John Electric Light Co., Ltd. | 3 | " " | " | 19 | 3,000 | 3,190 | 25 00 | |
| | Cie. de Gaz, Electricité and Pouvoir, St. Hyacinthe | 4 | " " | " | 35 | 6,000 | 6,350 | 25 00 | |
| | G. K. Nesbitt, Cowansville | 5 | " " | " | | 400 | 400 | 5 00 | |
| | Achille Gagnon & Co., Victoriaville | 6 | " " | " | | 6,000 | 6,000 | 25 00 | |
| | Cosey & Campbell, Bedford | 7 | " " | | | 670 | 670 | 10 00 | |
| | Farnham Electric Light Co. | 8 | " " | " | | 900 | 900 | 10 00 | |
| | Canadian Woollen Mills Co., St. Hyacinthe | 9 | " " | " | | 20 | 20 | 5 00 | |
| | Town of Drummondville | 10 | " " | " | | 937 | 937 | 10 00 | |
| | | | | | | | | | 130 00 |
| Three Rivers | Shawinigan Electric Light Co | 1 | C. I. R., Three Rivers | " | | 1,500 | 1,500 | 10 00 | |
| | North Shore Power Co., Three Rivers | 2 | " " | " | 86 | 7,000 | 7,860 | 25 00 | |
| | L'Electrique, de Grand Mere | 3 | " " | " | | 650 | 650 | 10 00 | |
| | Town of Joliette | 1 | C. I. R., Joliette | " | | 2,000 | 2,000 | 10 00 | |
| | | | | | | | | | 55 00 |
| St. John, N.B. | St. John Railway Co. | 1 | C. I. R., St. John | " | 122 | 10,780 | 15,000 | 25 00 | |
| | Carleton Electric Light Co. | 2 | " " | " | 29 | 500 | 790 | 10 00 | |
| | Fredericton Gas Light Co. | 3 | " " | " | 82 | 250 | 1,070 | 10 00 | |
| | St. Stephen Electric Light Co. | 4 | " " | " | 48 | 1,418 | 1,898 | 10 00 | |
| | Woodstock Electric Light Co | 5 | " " | " | | 900 | 900 | 10 00 | |
| | City of Moncton | 6 | " " | " | 90 | 5,350 | 6,250 | 25 00 | |
| | Sackville Electric Light and Telephone Co | 7 | " " | " | | 630 | 630 | 10 00 | |
| | Town of Campbellton | 8 | " " | " | 24 | 900 | 1,110 | 10 00 | |
| | Sussex Water and Electric Co | 9 | " " | " | 3 | 875 | 905 | 10 00 | |
| | Small & Fisher Co., Ltd., Woodstock | 10 | " " | " | | 500 | 500 | 5 00 | |
| | Town of Chatham | 11 | " " | " | | 2,000 | 2,000 | 10 00 | |
| | Town of Newcastle | 12 | " " | " | 20 | 300 | 500 | 5 00 | |
| | | | | | | | | | 140 00 |
| Halifax | Oxford Electric Co. | 1 | C. I. R., Halifax | " | | 550 | 550 | 10 00 | |
| | Town of Annapolis Royal | 2 | " " | " | | 850 | 850 | 10 00 | |
| | Kentville Electric Light and Power Co., Ltd. | 3 | " " | " | | 950 | 950 | 10 00 | |
| | Windsor Electric Light and Power Co., Ltd. | 4 | " " | " | 9 | 2,400 | 2,190 | 25 00 | |

## APPENDIX J—*Concluded.*

STATEMENT showing the Electric Light Companies registered under the Electric Light Inspection Act, during the year ended June 30, 1903.

| Districts. | From whom Collected. | Serial No. | By whom Collected. | Certificate for Fiscal Year. | Number of Lamps. | | | Registration Fees. | Totals. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Arc. | Incandescent. | Totals. | | |
| | | | | | | | | $ cts. | $ cts. |
| Halifax ........ | John Daly, Digby.. | 5 | C. I. R., Halifax.. | 1902 1903. | . | 700 | 700 | 10 00 | |
| | Acadia Electric Light Co.. | 6 | " " | " | .... | 900 | 900 | 10 00 | |
| | Dartmouth Gas, Electric Light, Heating and Power Co., Ltd.. | 7 | " " | " | ... | 950 | 950 | 10 00 | |
| | Yarmouth Street Railway Co., Ltd.... | 8 | " " | " | ...... | 170 | 170 | 5 00 | |
| | Yarmouth Gas Light Co., Ltd.... | 9 | " " | " | 36 | ........ | 360 | 5 00 | |
| | Halifax Electric Tramway Co., Ltd.... | 10 | " " | " | 305 | 24,200 | 27,250 | 25 00 | |
| | Town of Liverpool Electric Works.... | 11 | " " | " | 23 | 1,000 | 1,230 | 10 00 | |
| | Town of Parrsboro Electric Works.... | 12 | " " | " | 25 | 900 | 1,150 | 10 00 | |
| | Bear River & Digby Electric Light, Heating and Power Co., Ltd | 13 | " " | " | ...... | 475 | 475 | 5 00 | |
| | Chambers Electric Light and Power Co., Ltd., Truro.... | 14 | " " | " | .... | 5,000 | 5,000 | 25 00 | |
| | Edison Electric Light and Power Co. of Springhill, Ltd... | 15 | " " | " | 3 | 697 | 727 | 10 00 | |
| | Lunenburg Gas Co., Ltd.... | 16 | " " | " | 1 | 1,800 | 1,810 | 10 00 | |
| | Bridgetown Electric Light and Power Co., Ltd... | 17 | " " | " | ...... | 400 | 400 | 5 00 | |
| | Town of Bridgewater.... | 18 | " " | " | ...... | 990 | 990 | 10 00 | |
| | Canada Electric Co., Ltd., Amherst.... | 19 | " " | " | 7 | 2,600 | 2,670 | 25 00 | |
| | Logan & Co., Shubenacadie.... | 20 | " " | " | . | 250 | 250 | 5 00 | |
| | Antigonish Electric Co.... | 1 | C. I. R., Pictou.... | " | ..... | 1,000 | 1,000 | 10 00 | |
| | New Glasgow Electric Co., Ltd.... | 2 | " " | " | 30 | 4,600 | 4,900 | 25 00 | |
| | Cape Breton Electric Co., Ltd., North Sydney.... | 3 | " " | " | ... | 1,931 | 1,931 | 10 00 | |
| | Cape Breton Electric Co., Ltd., Sydney.... | 4 | " " | " | 11 | 7,524 | 7,634 | 25 00 | 35000 |
| Charlottetown .. | Montague Electric Co., Ltd.... | 1 | C. I. R., Charlottetown. | " | .... | 350 | 350 | 5 00 | |
| | Charlottetown Light and Power Co., Ltd.... | 2 | " " | " | 82 | 6,200 | 7,020 | 25 00 | |
| | Summerside Electric Co., Ltd.... | 3 | " " | " | 17 | 1,330 | 1,500 | 10 00 | 40 00 |
| Winnipeg.... | Town of Port Arthur.... | 1 | C. I. R., Port Arthur.... | " | | 1,261 | 1,261 | 10 00 | |
| | Water and Light Commissioners, Fort William.... | 2 | " " | " | 450 | 3,000 | 7,500 | 25 00 | |
| | Winnipeg Electric Street Railway Co.... | 1 | C. I. R. Winnipeg.... | " | 330 | 19,670 | 22,970 | 25 00 | |
| | Town of Neepawa.... | 2 | " " | " | 13 | 1,400 | 1,530 | 10 00 | |
| | Regina Electric Light and Power Works.... | 3 | " " | " | 4 | 1,500 | 1,540 | 10 00 | |
| | Central Electric Co. Ltd., Portage la Prairie.... | 4 | " " | " | 11 | 3,000 | 3,110 | 25 00 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | W. J. Bruce & Co., Selkirk | 5 | " " | " | .... | 700 | 700 | 10 00 | |
| | Citizens Telephone and Electric Light Co. Ltd., Rat Portage | 6 | " " | " | 22 | 3,000 | 3,220 | 25 00 | |
| | Marshall Vanalstine, Morden | 7 | " " | " | .... | 700 | 700 | 10 00 | |
| | Prince Albert Electric Light and Power Co. Ltd. | 8 | " " | " | .... | 477 | 477 | 5 00 | |
| | Brandon Electric Light Co., Ltd | 9 | " " | " | 15 | 6,000 | 6,150 | 25 00 | |
| | Carman Electric Light and Power Co., Ltd. | 10 | " " | " | 4 | 435 | 475 | 5 00 | |
| | | | | | | | | | 185 00 |
| Calgary | Calgary Water Power, Ltd | 1 | C. I. R., Calgary | " | 25 | 2,000 | 2,250 | 25 00 | |
| | Lethbridge Water Works and Electric Light Co., Ltd | 2 | " " | " | .... | 1,300 | 1,300 | 10 00 | |
| | Town of Edmonton | 3 | " " | " | .... | 1,400 | 1,460 | 10 00 | |
| | | | | | | | | | 45 00 |
| Vancouver | British Columbia Electric Railway Co., Ltd., Vancouver | 1 | C. I. R., Vancouver | " | 506 | 45,015 | 50,075 | 25 00 | |
| | Corporation of New Westminster | 2 | " " | " | 100 | 5,000 | 6,000 | 25 00 | |
| | West Kootenay Power and Light Co., Ltd., Rossland | 3 | " " | " | 53 | 4,999 | 5,529 | 25 00 | |
| | City of Kamloops | 4 | " " | " | .... | 2,500 | 2,500 | 25 00 | |
| | Greenwood Electric Light Co., Ltd | 5 | " " | " | 3 | 2,000 | 2,030 | 25 00 | |
| | Revelstoke Water, Light and Power Co | 6 | " " | " | 7 | 1,600 | 1,670 | 10 00 | |
| | Canadian Smelting Works, Trail | 7 | " " | " | 40 | 750 | 1,150 | 10 00 | |
| | City of Grand Forks | 8 | " " | " | .... | 1,800 | 1,800 | 10 00 | |
| | Cranbrook Electric Light Co., Ltd | 9 | " " | " | 1 | 724 | 734 | 10 00 | |
| | Kootenay Electric Co., Ltd., Kalso | 10 | " " | " | .... | 850 | 850 | 10 00 | |
| | Sandon Water-works and Light Co | 11 | " " | " | 4 | 900 | 940 | 10 00 | |
| | Crows Nest Pass Electric Light and Power Co., Ltd., Fernie | 12 | " " | " | .... | 911 | 911 | 10 00 | |
| | City of Nelson | 13 | " " | " | 8 | 4,348 | 4,428 | 25 00 | |
| | City of Vernon | 14 | " " | " | .... | 640 | 640 | 10 00 | |
| | | | | | | | | | 230 00 |
| Victoria | Victoria Electric Co., Ltd | 1 | C. I. R., Victoria | " | 2 | 300 | 320 | 5 00 | |
| | Nanaimo Electric Light, Heating and Power Co., Ltd | 2 | " " | " | 57 | 1,600 | 2,170 | 25 00 | |
| | British Columbia Electric Railway Co., Victoria | 3 | " " | " | 53 | 28,186 | 28,716 | 25 00 | |
| | Cumberland Electric Light Co., Ltd | 4 | " " | " | .... | 1,040 | 1,040 | 10 00 | |
| | | | | | | | | | 65 00 |
| | Total | | | | | | | | 4,155 00 |
| | Less—Refund as per statements Nos. 16, page 41, and 23, page 56, part 1 | | | | | | | .... | 15 00 |
| | | | | | | | | | 4,140 00 |

Inland Revenue Department,
Ottawa, August 18, 1903.

W. J. GERALD,
*Deputy Minister.*

# REPORT, RETURNS AND STATISTICS

OF THE

# INLAND REVENUES

OF THE

# DOMINION OF CANADA

FOR THE FISCAL YEAR ENDED JUNE 30

1903

## PART III

## ADULTERATION OF FOOD

*PRINTED BY ORDER OF PARLIAMENT*

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST
EXCELLENT MAJESTY
1904

# CONTENTS.

PAGE.

Deputy Minister's Report ... 5

Chief Analyst's Report ...... 7

Official Analyst's Reports :—

District of Halifax .... 8

do Montreal.... 8

do Toronto .... 9

do Winnipeg.... 9

do British Columbia ........ 10

Appendix A, Bulletin No. 82. Unfermented grape juice.. 11

do B, Bulletin No. 83. Lime juice and Catsup... 13

do C, Bulletin No. 84. Cereal breakfast foods...... 32

do D, Bulletin No. 85. Canned meats....... 60

do E, do 86. Fertilizers, 1903.......... 66

do F, do 87. Canned vegetables.......... 106

do G, do 88. Paris green.......... 114

# REPORT

OF THE

# DEPUTY MINISTER OF INLAND REVENUE.

## INSPECTION OF FOODS, DRUGS AND FERTILIZERS.

To the Honourable M. E. Bernier,
Minister of Inland Revenue.

Sir,—I have the honour to submit herewith the reports of the official analysts of the Dominion for the fiscal year ended June 30, 1903.

The following is a summary statement of the whole number of samples analysed by them :—

| Description of Samples. | Genuine. | Adulterated. | Doubtful. | Total. |
|---|---|---|---|---|
| Fertilizers | 67 | 5 | 4 | 76 |
| Paris Green | 83 | 2 | 2 | 87 |
| Total | 150 | 7 | 6 | 163 |

The following is a summary of the number of samples analysed by the chief analyst and his staff at the laboratory at Ottawa.

| Description of Samples. | Genuine. | Adulterated. | Doubtful. | Total. |
|---|---|---|---|---|
| Unfermented grape juice | 9 | 6 | 0 | 15 |
| Wine | 2 | 1 | 0 | 3 |
| Lime juice | 20 | 7 | 0 | 27 |
| Catsup | 7 | 8 | 9 | 24 |
| Cereal foods | 20 | 0 | 0 | 20 |
| Canned meats | 94 | 5 | 0 | 99 |
| Canned vegetables | 98 | 2 | 0 | 100 |
| Fertilizers | 15 | 1 | 0 | 16 |
| Paris green | 71 | 2 | 1 | 74 |
| Total | 336 | 32 | 10 | 378 |

Besides the foregoing, 40 samples of fertilizers and seven samples of Paris green, the duplicates of which were examined by district analysts, were also analysed at the laboratory in Ottawa.

The following statement shows the total number of samples examined during the fiscal year ended June 30, 1900, 1901, 1902 and 1903 respectively :—

| — | During the Fiscal Year ended June 30. | | | |
|---|---|---|---|---|
| | 1900. | 1901. | 1902. | 1903. |
| 1. Number of samples collected by the food inspectors for examination | 895 | 885 | 883 | 541 |
| 2. Number of these samples examined by the public analysts. | 756 | 881 | 883 | 163 |
| 3. Number of these samples examined in the laboratory here. | 181 | 243 | 270 | 425 |
| 4. Number of samples examined at the laboratory here, duplicates of which were not analysed by the public analysts. | 730 | 802 | 600 | 1,017 |
| This number however includes the following :— | | | | |
| Samples of beer | 44 | 25 | 32 | 70 |
| " vinegar | 360 | 413 | 346 | 366 |
| Standard fertilizers | 107 | 102 | 106 | 128 |
| Samples examined for other departments :— | | | | |
| Marine and Fisheries | 1 | 3 | 15 | 8 |
| Public Works | 0 | 0 | 3 | 0 |
| Militia and Defence | 2 | 0 | 3 | 16 |
| Indian Affairs | 0 | 0 | 6 | 2 |
| Agriculture | 0 | 0 | 15 | 3 |
| Police Branches | 1 | 1 | 1 | 0 |
| Interior | 0 | 0 | 2 | 0 |
| Trade and Commerce | 0 | 2 | 0 | 0 |
| Railways and Canals | 0 | 0 | 0 | 97 |
| Customs | 0 | 0 | 0 | 4 |

I have the honour to be, sir,
Your obedient servant,

W. J. GERALD,
*Deputy Minister.*

Inland Revenue Department,
Ottawa, Dec. 28, 1903.

# REPORT OF CHIEF ANALYST.

317 Queen Street,
Ottawa, December 12, 1903.

W. J. Gerald, Esq.,
Deputy Minister of Inland Revenue,
Ottawa.

Sir,—In accordance with your request of 1st inst., I beg to supply the following statement as regards the examination of food and other samples in this branch during the year ended June 30, 1903.

| | | |
|---|---|---|
| 1. Number of samples collected by the food inspectors for examination | | 541 |
| 2. Number of these samples examined by the public analysts. | | 163 |
| 3. Number of these samples examined in laboratory here | | 425 |
| 4. Number of samples analysed in the laboratory here, duplicates of which were not examined by the public analysts. | | 1,017 |
| This number however includes the following :— | | |
| Samples of beer | 70 | |
| Samples of vinegar | 366 | |
| Standard fertilizers | 128 | |
| Samples examined for other departments :— | | |
| Marine and Fisheries | | 8 |
| Railways and Canals | | 97 |
| Militia and Defence | | 16 |
| Indian Affairs | | 2 |
| Agriculture | | 3 |
| Customs | | 4 |

I have the honour to be, sir,
Your obedient servant,

THOMAS MACFARLANE,

# REPORT OF PUBLIC ANALYSTS.

66 Bedford Row,
Halifax, N.S., November 23, 1903.

The Deputy Minister of Inland Revenue,
Ottawa.

Sir,—I have the honour to submit my annual report on the samples of food, &c., received for analysis under the Adulteration Act during the year ending June 30, 1903,

| | Genuine. | Not registered. | Adulterated. | Total. |
|---|---|---|---|---|
| Fertilizers | 12 | 2 | 1 | 15 |
| Paris green | 20 | ........ | 1 | 21 |
| Total | 32 | 2 | 2 | 36 |

I have the honour to be, sir,
Your obedient servant,

MAYNARD BOWMAN,

---

112 St. François-Xavier Street,
Montreal, November 25, 1903.

The Deputy Minister,
Inland Revenue Department.
Ottawa.

Sir,—I have the honour to present my report on the analysis of samples which have been submitted to me by your department, during the fiscal year ending June 30, 1903.

I have analysed 26 samples in all, namely: 10 samples of fertilizers and 16 samples of Paris green.

Of the fertilizers one sample was in my opinion adulterated according to the Act, in that it contained over one per cent less than the guaranteed percentage of total phosphoric acid without equivalent compensation in the form of an excess of other ingredient. The other nine samples I have reported as genuine.

Of the 16 samples of Paris green one was found to be adulterated with barytes and sulphate of lime. The remaining 15 are genuine.

I have the honour to be, sir,
Your obedient servant,

J. T. DONALD.

FACULTY OF APPLIED SCIENCE AND ENGINEERING, UNIVERSITY OF TORONTO,

TORONTO, 4th December, 1903.

To the Commissioner of Island Revenue,
Ottawa.

SIR,—I beg to submit the following report of the work done in my district during the past year.

During this year twenty-six samples have been submitted to me by the inspectors under the Act; of these sixteen were samples of Paris green, and ten, samples of fertilizers.

The results of the analysis of these samples are given below in tabular form :—

| — | Unadulterated. | Adulterated. | Doubtful. |
|---|---|---|---|
| Paris green | 14 | ..... .. | 2 |
| Fertilizer | 5 | 3 | 2 |
| Total | 19 | 3 | 4 |

Two samples of Paris green contained an excess of arsenic over that required. These are reported doubtful.

Three samples of fertilizer were reported as below the standard, and two which were not registered were classified as 'doubtful.'

I have the honour to be, sir,
Your obedient servant,
W. H. ELLIS.

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282 ASSINIBOINE AVENUE,
WINNIPEG, MAN., NOV. 21, 1903.

The Commissioner of Inland Revenue,
Ottawa.

SIR,—I have the honour to report that during the past year I have analysed 15 genuine samples of fertilizers and 18 of Paris green.

I have the honour to be, sir,
Your obedient servant,
EDGAR B. KENRICK.

PUBLIC ANALYST'S OFFICE, VICTORIA, B.C.,
November 25, 1903.

To the Commissioner of Inland Revenue,
Ottawa.

SIR,—I beg to submit report for year ending June 30, 1903.

| Samples. | Genuine. | Adulterated. | Total. |
|---|---|---|---|
| Paris green | 16 | 0 | 16 |
| Fertilizers | 26 | 0 | 26 |
| Total | 42 | 0 | 42 |

The fertilizers were in some instances so badly mixed that an injustice is almost sure to result.

I have the honour to be, sir,
Your obedient servant,
C. J. FAGAN,

## APPENDIX A.

## BULLETIN No. 82—UNFERMENTED GRAPE JUICE.

OTTAWA, November 12, 1902.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—I beg to submit herewith a schedule giving the results obtained in this laboratory from the examination of certain samples of unfermented grape juice, collected in accordance with your instructions of July 3 last. Two additional samples were collected in the Calgary district, but lost in transit. Of the 18 samples actually examined it will be seen that three were fermented wines, no doubt taken by the food inspectors through inadvertence. Among the remaining samples of unfermented grape juice four contained small quantities of alcohol, and in three cases the quantity was higher than the legal limit allowed in England for 'herb, ginger and botanic beers,' which is 2 p. c. proof spirit. The samples in question are:—

No. 21233 with 3·30 p. c. proof spirit.
21235 " 3·03 " "
21679 " 2·34 " "

It has also to be pointed out that of the 15 samples of unfermented grape juice, 9 have been found genuine and 6 to contain salicylic acid as preservative. As to whether the use of salicyclic acid in unfermented wine is permissible, it may be profitable to quote from a recent work on standards of purity for foods and drugs by C. J. Moor, a public analyst, and author of several works on food analysis in London, England. On preservatives generally Mr. Moor writes as follows:—

'The question as to the propriety of adding preservatives to foods is one which has excited much attention, and is still a source of frequent contention. Some analysts do not regard the addition of preservatives as constituting adulteration, while others do.

'The question appears to have a different bearing according to the kind of article in question, and preservatives should be allowed in some articles (but their presence should be in all cases acknowledged), and in certain others they should not be allowed in any circumstances.

'In the case of those articles in which they are allowed, a limit should be agreed on of those preservatives which are generally considered to be harmless, and official methods should be published for their estimation.

'In the case of those articles which can be readily made and sold without any addition of preservatives, I consider that they ought to be preserved by sterilization alone.'

The last paragraph applies in the present case, for the results now reported prove that unfermented grape juice can be made and kept for sale without any addition of preservatives.

As to whether salicylic acid may now be legally used as a preservative, this appears to be forbidden by section 2 (e) (6) of the Adulteration Act, which provides that food shall be considered adulterated if it contains any ingredient which may render it injurious to the health of the person consuming it. It would, however, be a difficult matter to prove the injurious character of small admixtures of salicylic acid, and authorities are divided in opinion on the subject. By section 17, as amended, salicylic acid is mentioned (in the first schedule of the Adulteration Act) among those substances which, if added to alcoholic, fermented or other potable liquors, would cause them to be regarded as injurious to health. Since unfermented grape juice may reasonably be included among 'other potable liquors,' it is thus evident that the addition of salicylic acid is contrary to law.

I have the honour to be, sir,
Your obedient servant,
THOS. MACFARLANE,
*Chief Analyst.*

## RESULTS of Analysis of Eighteen Samples of Unfermented Wines

| Date of Collection. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher. | No. of Sample. |
|---|---|---|---|
| 1902. | | | |
| July 31 | G. E. Hughes, Charlottetown, P.E.I. | Welch Grape Juice Co. | 4307 |
| " 31 | J. G. Jamieson, Charlottetown, P.E.I. | " " | 4316 |
| Aug. 7 | Methodist Bookroom, Halifax, N.S. | Hagar Bros., Welland, Ont. | 20233 |
| " 7 | Brown & Webb, Halifax, N.S. | Welch Grape Juice Co., Westfield, N.Y. | 20234 |
| July 23 | E. Clinton Brown, St. John, N.B. | Hagar Bros., Welland, Ont. | 17847 |
| " 25 | C. P. Clarke, St. John, N.B. | Welch Grape Juice Co., Westfield, N.Y. | 17849 |
| " 23 | G. Dupuis, St. John, Que. | The Ontario Grape Growing and Wine Manufacturing Co., St. Catharines. | 23335 |
| " 24 | F. Poitras, St. Hyacinthe | S. Ernest Maranda, St. Hyacinthe | 23336 |
| " 22 | J. T. Lyon, Bleury St. Montreal | Welch Grape Juice Co., Westfield, N.Y. | 21224 |
| " 25 | M. McMillan, Brockville, Ont. | Turner & Co., Toronto | 21233 |
| " 25 | J. A. Johnston, Brockville, Ont. | F. A. Lytle & Co., Toronto | 21235 |
| " 31 | Hagar Bros., Welland | Hagar Bros., Welland | 21237 |
| Aug. 1 | Michie & Co., King St., Toronto | F. A. Breck, Vineland, N.Y. | 21240 |
| July 23 | D. Rush, Wingham, Ont. | Turner & Co., Toronto | 22039 |
| " 23 | B. B. Gunn, Seaforth, Ont. | Chautauqua Fruit Co., Ripely, N.Y. | 22041 |
| " 31 | McNab & Roberts, Winnipeg, Man. | J. J. McLaughlin, Toronto | 17424 |
| " 31 | McDowell Watson Co., Vancouver | Tokay Wine Co., Gennesse, N.Y. | 21679 |
| " 31 | " " | K. Campbell, Montreal | 21683 |

(Grape Juice) examined specially for Alcohol and for Antiseptics.

| Acidity ; Grammes per 100 Cc. | | | Density of | | Alcohol p. c. by weight. | Antiseptic Found. | Remarks. |
|---|---|---|---|---|---|---|---|
| Total as Tartaric Acid. | Fixed as Tartaric Acid. | Volatile as Acetic. | The Wine. | Distillate to Equal Volume. | | | |
| 0·690 | 0·330 | 0·288 | ....... | 0·9998 | Trace.... | None ....... | Genuine. |
| 0·615 | 0·600 | 0·012 | ....... | 0·9998 | Trace..... | None ........ | " |
| 0·405 | 0·150 | 0·204 | ....... | 0·9999 | Trace.... | None ........ | " |
| 0·900 | 0·150 | 0·600 | ...... | 0·9998 | Trace..... | None ........ | " |
| 0·495 | 0·060 | 0·348 | ....... | 1·0000 | None..... | None ........ | " |
| 0·705 | 0·690 | 0·012 | ....... | 0·9998 | Trace..... | Salicylic acid.. | Contains salicylic acid. |
| 0·720 | ...... | ........ | ........ | 0·9841 | 10·00 | ........... | Samples of Canadian wines collected by mistake. |
| 0·540 | ...... | .......... | ......... | 0·9787 | 14·18 | ........... | |
| 0·825 | 0·555 | 0·216 | ........ | 0·9998 | Trace. .. | None ........ | Genuine. |
| 0·720 | 0·555 | 0·132 | ....... | 0·9973 | 1·50 | Salicylic acid.. | Contains salicylic acid. |
| 0·645 | 0·465 | 0·144 | ....... | 0·9975 | 1·37 | " | " |
| 0·375 | 0·375 | None..... | 1·1008 | 0·9998 | Trace... | None ........ | Genuine. |
| 0·525 | 0·525 | None. ... | ...... | 0·9998 | Trace. ... | None ........ | " |
| 0·780 | 0·540 | 0·192 | ......... | 0·9984 | 0·84 | Salicylic acid.. | Contains salicylic acid. |
| 0·420 | 0·345 | 0·060 | 1·0792 | 0·9997 | Trace..... | None ........ | Genuine. |
| 0·990 | 0·165 | 0·660 | 1·0971 | 1·0000 | None..... | Salicylic acid.. | Contains salicylic acid. |
| 0·630 | None. ... | 0·504 | 1·1227 | 0·9980 | 1·06 | " | " |
| 0·600 | None..... | 0·480 | 1·1136 | 0·9844 | 9·79 | " | Is a fermented wine. |

## APPENDIX B.

## BULLETIN No. 83—LIME JUICE AND CATSUP.

OTTAWA, December 151902.

W. J. GERALD, Esq.,
Deputy Minister Inland Revenue.

SIR,—I beg to transmit herewith a report of Mr. A. McGill, M.A., assistant analyst to the chief analyst, on Lime Juice and Ketchup or Catsup together with tabulated statements of the analytical results obtained by him in this laboratory, which also show the nature and origin of the different samples examined.

I have the honour to be, sir,
Your obedient servant,

THOS. McFARLANE,
*Chief Analyst.*

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LABORATORY OF THE INLAND REVENUE DEPARTMENT,
OTTAWA, November 25, 1902.

THOS. MACFARLANE, Esq., F.R.S.C.,
Chief Analyst.

SIR,—I beg to submit my report upon Ketchup and Lime Juice, together with a memorandum in which I have endeavoured to present, as clearly as I can, the state of existing knowledge on the subject of preservatives in food and of artificial colouring matters therein.

I have the honour to be, sir,
Your obedient servant,

A. McGILL.

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LABORATORY OF THE INLAND REVENUE DEPARTMENT,
OTTAWA, November 24, 1902.

MEMORANDUM accompanying a report upon 24 samples of Ketchup and 27 samples of Lime-juice.

In these reports, as well as in that concerning unfermented grape juice (18 samples) which I handed in on the 27th ult., I have specially kept in view the detection of chemical preservatives and of artificial colouring matters.

Although I have, in most cases, made these determinations quantitatively, I prefer, in these reports, merely to state the presence or absence of the preservative, or colouring matter, without giving any statement of the quantity found. It is well known (see paragraph 75, Report of the British Food Commissioners, and elsewhere) that quantitative methods for the estimation of preservatives and colouring matters in foods, are far from being perfect. Work is being done in this laboratory, and in all national food laboratories, with a view to perfecting methods of research; and there is little doubt that methods commanding universal acceptance and recognition will soon be available. Meantime, our qualitative processes are above suspicion, and the presence of these antiseptics and dyestuffs can be ascertained with absolute certainty in most cases. The following note shows that it is not only the peculiar nature of the food stuff, which may present difficulties to the analyst, but that manufacturers of preservatives seek, by making these as complex as possible, to hamper the search for them, in food.

In November, 1898, (Analyst, 1898, p. 309) A. C. Chapman, F. I. C., called the attention of the British Society of public analysts to the fact that very complex mixtures were sometimes put on the market as food preservatives. He had found one which contained sulphate of alumina, chloride of sodium, nitrate of sodium, sulphurous acid, chloral hydrate, benzoic acid and iodine, the last probably as hydriodic acid.

Dr. Rideal, in discussion, said that he had met with several such complex preservatives, which he asserted to be almost invariably of French origin, and probably intended to baffle analysts through the introduction of a large number of ingredients.

In a few of the ketchups it will be seen that two different preservatives are present: but for the most part I find that a single substance of the kind is employed.

The extensive use of chemical preservatives in perishable foods is one of the most noteworthy features of our time. That the use of antiseptics is very general, is proven by the result of our own experience, and by the various reports issued by the governments of civilized countries, which make official investigation of foods and drink sold in the open market.

This is illustrated in a forcible way by the report of A. E. Leach, of the State Board of Health, Massachusetts (Analyst, 1901, p. 289). During the summer months of 1898, 1899 and 1900, 5,169 samples of milk were examined for preservatives, and 179 samples, or 3·5 per cent. of the whole number, were found to contain such. Of this number 142 contained formaldehyde, and 30 contained boracic acid.

In the Report of the Conn. Agri. Expt. Stn., for 1899 (p. 139) after a summary of reasons for condemning the wide-spread use of chemical preservatives in food, occurs the following:—

The Station has secured a considerable number of the advertised preservatives, and these have been qualitatively and as far as possible quantitatively analyzed. Results of analysis are as follows:—

'Freezine'—B. Heller & Co., Chicago—A 5·19 per cent. solution of formaldehyde.
'Iceline'—Heller Chemical Co., Chicago—is 1·92 p.c., formaldehyde.
'Special M. Preservaline'—A solution of formaldehyde, 1·99 per cent.
'Rex Magnus, Snow Flake Brand'—Contains 78·15 per cent. boric acid.
'Rex Magnus, Pearl Brand'—Contains 95·72 per cent. boric acid.
'M. Preservaline'—Contains 97·81 per cent. boric acid.
'B. B. Preservaline'—Contains 65·42 per cent. boric acid.
'Preservaline Butter Powder'—Is merely bi-carbonate of soda.
'Cream Albuminoid'—Contains 50·4 per cent. boric acid.
'Preservaline for Cider'—Is salicylic acid only.
'Blue Seal Preservative'—Contains 70·24 per cent. salicylic acid.
'Forman's Cider Preservative'—An alcoholic solution of beta-naphtol.
'Preservite'—Contains 96 per cent. benzoate of soda.
'Forman's Preservative for Wine'—Contains 36·13 per cent. formaldehyde.
'Compressed Preserving Powder for Beer'—Contains 49·01 per cent. of salicylic acid.
'Emken's Preserving Cakes'—Contained 22·09 per cent. salicylic acid.
'A Boake Roberts and Co's., K.M.S.'—Tablets containing 84·35 p.c., bisulphite.
'K. M. S. Preserving Powders'—Contained 25·47 per cent. bisulphite.

'Rex Magnus, Viandine Brand'—Contained 81·77 per cent. boric acid.

'Sportsman's Rex'—Same composition as last.

'Ocean Wave Brand'—Contained 88·85 per cent. boric acid.

'A' preservaline for sausages—Contained 68 per cent borax.

'Freeze-Em'—Contains 29·19 per cent sulphurous acid.

'Maas and Waldstein's Preserving Salts'—Six samples contained from 29·05 to 33·16 per cent boric acid.

Sulphurous acid has been reported in dried fruits, chiefly American, by Beythien and Bohrisch (Zeit. für Untersuch. der Nah. und Genussmittel, 1902, 401)—Californian apricots contained from 0·216 to 1·158 per cent, (calculated as crystallized sodium sulphite) peaches, 0·992 per cent, pears 0·2399 per cent—Italian prunes contained 0·264 per cent.

The most largely used preservatives are undoubtedly salicylic acid, formaldehyde and boracic acid; but new substances are being added to this list from time to time. Thus sulphurous acid and sulphites, benzoic acid, fluoride of sodium and many other articles of an antiseptic character are quite frequently reported and according to A. H. Allen (Analyst, 1902, 178)—the use of silico-fluoride of sodium as a preservative is patented in England, and the compound is manufactured to a considerable extent at Warrington.

The following extract is from the Report of the Massachusetts State Board of Health, 1899—p. 614:—

'The manufacturer of a largely used preservative, known as 'Freezine' (which is a weak solution of formaldehyde) issues an attractive pamphlet in which he makes the following remarkable claims.' It is not an adulterant.—It immediately evaporates, so that no trace of it can be found, as soon as it has rendered all the bacteria inert. No chemical analysis can prove its presence in the milk quantitatively or otherwise.' Its use in milk is also claimed by the manufacturer to be beneficial to the health of infants, many of whom have been saved from sickness and even death, he alleges, by a liberal use of 'Freezine' in the milk.'

Probably the newest suggestion for a preservative for milk is that of Jablin Gonnet —(Ann. Chim. Analyt., 1901, 129—through the Journ. Soc. Chem. Indust., 1902, 420) who states that '1 c.c. of a 12 per cent. solution of hydrogen peroxide added to 1litre of milk, prevented spoiling for two days; 2 c.c. for four days and 6 c.c. for six days, at a temperature of 20° C=68° F. The hydrogen peroxide cannot be tasted in the milk, and according to a series of physiological experiments, is harmless to the human system.'

National attention in England was drawn to the matter in 1897 by the 'Lancet,' which issued a circular letter to certain very eminent physicians, for the purpose of securing expert opinion on the whole subject.

This circular proposed the following questions:—

(1) Is the presence of small quantities of salicylic, boric or benzoic acids or formaline in food, in sufficient quantities to preserve it, injurious to health?
(2) Should the use of antiseptics for this purpose be forbidden by law altogether?
(3) Should legislation be brought to bear on the restriction of the amount?
(4) Should the law insist that when preservatives are used the fact should be stated on the label?

Sir HENRY THOMPSON wrote that 'he had long held that the addition of antiseptics was undesirable, though unable to produce evidence that any one of them had given rise to deleterious action owing to the impossibility of isolating the precise influence of the drug. He objects strongly to the dietetic use of drugs, and is of opinion that the name and quantity of the antiseptic employed should be on the label, or on a paper setting forth the maker's or vendor's name.'

Dr. PAVY wrote that 'he did not consider our knowledge sufficiently extended to permit of its being taken for granted that no injury is producible, though there is no evidence of injury to health. He points out that it is the vendor, and not the consumer, that is benefited. He considers that, notification of the fact of antiseptics being employed, and their nature and amount would be sufficient; any deviation from the notification should be liable to prosecution. With the public interest thus safeguarded, he thinks that advantage might be taken of the power of antiseptics in preserving articles of food.'

Dr. F. J. Allen points out the possibility of daily accumulation of antiseptics quite sufficient to produce a gradual lowering of the standard of health, and is of opinion that the fact of an antiseptic being added, and its nature, should be required by law to be announced at the time of sale.

Dr. Sims Woodhead draws attention to idiosyncracy and cumulative effect, and dwells upon our ignorance of the action of certain drugs (*e.g.*, formalin) on food stuffs. He points out that by the use of preservatives foods of inferior quality may be doctored. He would make the use of antiseptics illegal unless their nature and quantity be made known.

The late Sir B. W. Richardson considered that antiseptics are not only necessary at this moment, but when used in proper form and quantity cause no injury whatever. There ought to be a license given permitting a certain fixed, and not a dangerous, quantity of antiseptic, and it ought to be stated on the label what the antiseptic is and its quantity.

Dr. T. Lauder Brunton writes that 'one must remember that poisons are formed in foods by spontaneous decomposition, which may take place after purchase. The question to be decided comes to be whether antiseptics are likely to be more injurious to health than the natural products of decomposition. His own belief is that preservatives are the less injurious. His answers are: (1) The use of antiseptics should not be forbidden by law. (2) It is doubtful whether legislation should restrict the amount, as the makers will probably use the minimum amount found sufficient. (3) The fact of preservatives being used, and their amount, should be stated on the label.'

Sir W. Roberts says that 'there is no reliable information available, and an inquiry is needed.'

Dr. W. D. Halliburton is not able to give information as to injurious effects from his experience, but quotes F. J. Allen as mentioning cases of ill health in children due to boric acid.

Dr. J. R. Bradbury thinks that 'it is not necessary to forbid antiseptics, but that the amount should either be restricted, or the fact of their addition stated on the label.'

Dr. Whitelegge cannot speak positively, though it is clear to him that the law should insist upon a plain statement on the label if any preservative be added.'

I am tempted to make one remark in connection with the report of Dr. Brunton. The claim that antiseptics should be used in perishable foods because they are less injurious to health than the poisonous products of the spontaneous decomposition of these foods, seems to me quite untenable. The decomposition of food should be a fact of exceptional occurrence, and such food should be rejected altogether; whereas the systematic addition of an antiseptic to food, in order to prevent decomposition, would result in the habitual dietetic use of a powerful drug.

Recognizing the national importance of the problem, a departmental committee was appointed in July, 1899, to report to the British Parliament upon the following subjects:—

1. Whether the use of such materials (preservatives and colouring matters) or any of them, for the preservation and colouring of food, in certain quantities, is injurious to health, and if so, in what proportions does their use become injurious.

2. To what extent, and in what amounts, are they so used at the present time.

The committee consisted of the Right Honourable Sir H. E. Maxwell, Bart., M.P.; Professor T. E. Thorpe, C.B., D.Sc., F.R.S.; Dr. T. H. Bulstrode and Dr. F. W. Tunnicliffe.

The committee reported to parliament in the following year; and as the evidence taken represents the knowledge of the scientific world upon the subject of preservatives, up to the year 1900, it may be well to make some extracts from the report as presented. This report together with the minutes of evidence and appendix, forms a closely printed volume of 497 folio pages, 'From the evidence brought before the Committee it would appear that, at the present time, the only artificial or chemical antiseptic agents other than oils, spirits of wine, vinegar, salt, sugar, etc., employed, or said to be employed, in the preservation of food are :—

Boric or boracic acid and borates ; so-called 'boron preservatives'.
Sulphurous acid and sulphites.
Fluorides.
Salicylic acid.
Benzoic acid or benzoates.
Formalin or formaldehyde.

'As regards fluorides, benzoic acid and the benzoates it may be said at once that, if employed at all, their use must be extremely limited. Mr. Leonard Boseley, Analyst to Messrs. Keiller and Son, Limited, stated that he believed that a firm in London were trying to get benzoate of soda taken up as a preservative for jams.

'The boron preservatives are generally sold in the form of a white powder (sometimes however coloured with a coal tar dye) under a great variety of fanciful names, which as a rule afford no clue to their real nature. They are used largely for dairy produce, for margarine, ham, bacon, sausages and preserved meat foods generally, and to a much smaller extent in beverages.

'Salicylic acid comes next in the extent to which it is used. It is employed chiefly in beverages and in foods derived from fruit.

'Formalin, which is of comparatively recent introduction consists of a 40 per cent. solution of formaldehyde in water. The solution is diluted to various strengths, and sold as a preservative for milk chiefly, and to a less extent for other foods.

'Sulphites are used for very much the same purposes as salicylic acid, especially by brewers. They are also employed by butchers, and to a less extent by game and poultry dealers.

'As the result of an inquiry among a large number of farmers and dairymen, 110 replies were received, and 65 of these admitted the use of preservatives.

Of 4,251 food samples examined for the Committee in the government laboratory, 1,659 samples (=39 per cent.) were found to contain preservatives, as follows :—

| | | |
|---|---|---|
| Boric acid | 1,247 | samples. |
| Salicylic acid | 320 | „ |
| Formalin | 20 | „ |
| Sulphites | 143 | „ |

(71 samples were found to contain two preservatives of different kinds.)—

| | | | | | | |
|---|---|---|---|---|---|---|
| Of | 290 | samples of | cream, | 77·9 | p.c. contained | preservatives. |
| „ | 364 | „ | butter, | 57·1 | „ | „ |
| „ | 210 | „ | bacon, | 70·5 | „ | „ |
| „ | 185 | „ | ham, | 82·7 | „ | „ |
| „ | 226 | „ | sausages, | 66·4 | „ | „ |
| „ | 48 | pork pies, | | 70·8 | „ | „ |
| „ | 150 | samples | jam | 44·0 | „ | „ |
| „ | 78 | „ | lime & lemon juice | 88·5 | „ | „ |
| „ | 769 | „ | temperance drinks | 26·1 | „ | „ |
| „ | 100 | „ | imported beers | 39·0 | „ | „ |

'A comparison of the percentages of preservatised foods in the poorer districts and the wealthier districts of London, respectively, shows that they are practically identical, being 42·9 per cent in the former and 43·4 per cent in the latter.

'Preservatives are extensively used in certain foods imported into the United Kingdom from the colonies and foreign countries, especially in butter from Australia, in ham and bacon from Canada, and in butter and margarine from France, Holland and Belgium.

'Of the temperance beverages received from all parts of the United Kingdom, 83·5 per cent of those sold as temperance 'wines' and cordials, contained preservatives' chiefly salicylic acid, and to a less extent sulphites, 'With regard to the amount of the several preservatives, it appears that the boracic acid in the milks varied from 1·3 to 9·1 grains per pint: in cream from 10 to 57 grains per pint; in sausages, potted meats and brawn, from 15 to 66 grains per pound; in butter from 18 to 65 grains per pound; in bacon from 8·6 to 46 grains per pound. The amount of salicylic acid in jams varied from 1·7 to 8·5 grains per pound: in temperance drinks and cordials from 1·5 to 19 grains per pint; in herb beers and similar beverages from 0·5 to 8·1 grains per pint; and in imported beers from 1·3 to 3·4 grains per pint. Sulphites were found to be contained in lime juice, ginger wine, lemon syrup, raspberry and peppermint cordial in amount (estimated as sulphur dioxide) varying from 0·1 grain to 4·5 grains per pint.

'Mr. Vasey, who has been employed for upwards of ten years to examine foods and beverages on behalf of the 'Lancet', stated that he had found boric acid in meat peptone and beef jelly intended for invalid use, and that practically all the samples of invalid foods which he had occasion to analyze contained chemical preservatives.

'Dr. Vœlcker testified from personal observation, to the casual and haphazard manner in which both farmers and vendors add preservatives to milk.'

### COLOURING MATTERS.

'The crude and gross sophistication of foods with mineral colouring matters, known to be more or less poisonous, appears to be a thing of the past.

'Sulphate of copper is, however, still extensively used in the colouring of peas and other green vegetables.

'The most commonly used colouring matter for dairy produce is annatto. This, and certain other yellow colouring matters of vegetable origin (turmeric, saffron, etc.) have generally been considered harmless in the quantities employed, but they are gradually being superseded by coal-tar yellows, the action of which upon the human system is not fully known.

'The colours to be obtained from coal-tar are practically unlimited in variety, and their tinctorial power is so great that very small quantities suffice to produce the required tint. They are consequently coming into increasing favour to replace the red, yellow, orange, green, blue and violet colours required for jams, temperance drinks, sweets and confectionery. A mixture of an azo-red and a brown allied to Bismark brown is used for imitating the smoke colour of hams.'

The report continues as follows:—

'Convinced as we are of the very general and increasing use of chemical preservatives by traders in the more perishable articles of food, we desire now to focus the evidence which has been placed before the committee, as to whether such preservatives may be expected to be attended with any risk to the public health.

'The evidence given before the committee bearing on this question, may be classified as that of:

A. The public analyst.
B. The medical officer of health.
C. The physician and surgeon.
D. The physiologist and pharmacologist.

### A.—THE EVIDENCE OF THE PUBLIC ANALYST.

1. Prosecutions have exercised an inhibiting effect upon the use of preservatives.

2. Maximum amounts found must be regarded as exceptional and unnecessary: yet there is no guarantee that such excessive amounts may not continue to be used.

3. With regard to the precision with which limits could be determined, there was some difference of opinion; and as regards formalin, the evidence was unanimous that the estimation of such minute quantities as may be present in foods, is attended with great difficulty.

4. As to colouring matters the general testimony was to the effect that the nature and amounts of the substances in general use at the present time is such that but little danger is likely to accrue to the public health therefrom.

### B.—THE EVIDENCE OF THE MEDICAL OFFICER OF HEALTH.

1. The medical officers of health were practically unanimous in their opinion that all preservatives should be prohibited in milk.

2. They saw danger in the unknown administration of drugs in morbid conditions of the body; and pointed out that such drugs are used at times, in amounts far in excess of those sanctioned by the B. P.

3. When more attention is paid by medical men to the use of preservatives, obscure conditions such as indigestion, malaise, faintness, &c., which at present receive no adequate explanation, may be made clear.

### C.—THE EVIDENCE OF THE PHYSICIAN AND SURGEON.

1. Was not very conclusive, and it is evident that the question of food preservatives had not, at the time of inquiry, received special consideration by the medical profession.

2. Dr. Anderson had found that daily doses of 10 to 20 grains of boracic acid is generally followed by dyspepsia "sufficiently pronounced to make life miserable while it lasts, and at times it causes distinct gastritis, with repeated vomiting."

Sir Lauder Brunton considered that boracic acid was capable of exercising an injurious effect upon pregnant women.

3. On the other hand, an assistant physician at the London hospital described extended experiments as to the effects of borax and boracic acid upon himself, which resulted in "no sort of stomach irritation or intestinal irritation or trouble, or anything of that sort at all."

The consulting surgeon to Westminster hospital had administered borax to hundreds of patients in doses of 10 grains, 3 times a day, and up to 40 grains a day, and never found any evil or unpleasant effects, except in those patients who having kidney disease could not void the drug readily.

3. In so far, however, as expression of opinion went, the profession was almost unanimous in its condemnation of the present unrestricted use of preservatives. The medical profession was clearly impressed with the importance of at least intimating by a system of labelling, the nature, and when practicable, the amount of the preservative used. In the opinion of Sir Lauder Brunton and other witnesses, it is a serious matter that a medical man should prescribe a daily dose of any drug to a patient who may, unknown to himself and the physician, be consuming an indefinite quantity of the same drug in his food. He also pointed out that by the indiscriminate employment of drugs there was a possible danger that the action of certain drugs might be, if not entirely nullified, at least reduced in effect.

4. There was, however, another aspect of the question to which certain witnesses referred. They were of opinion that there are certain conditions of the human economy in which the administration of drugs, such as boracic acid and salicylic acid, are held to be contra-indicated. Among such conditions, specific reference was made to inflammatory states of the digestive tract, and of the reproductive organs.

### D—EVIDENCE OF THE PHYSIOLOGIST AND THE PHARMACOLOGIST.

1. All these witnesses strongly deprecated the unregulated use of preservatives, at least those at present known, and of any colouring matter having a possible deleterious effect upon the human system; and were generally agreed that formic aldehyde was a dangerous substance, even in very dilute solution.

2 An opinion inimical to the use of preservatives was also held by some of these witnesses on the ground that these substances were added to food for the purpose of destroying or preventing the development therein of living organisms, and hence that these same substances when introduced into the highly organized animal, could not behave indifferently to living matter, but must also tend to exert upon it some influence. Especially, they maintained, was this the case since the secretion of the digestive juices was dependent upon the activity of cells not differing sufficiently from microorganisms to render it probable that substances affecting deleteriously the one would be indifferent to the other.

3. Other objections offered by the physiologists applied especially to one preservative, viz., formalin, and were based upon the fact that this substance actually enters into combination with the proteid constituents of the food, the compound formed being less digestible than the original substance, thereby entailing a nutritive loss to the consumer.

4. Other witnesses testified to the value of chemical preservatives in protecting consumers from the evils of tainted or decomposing food. One witness said that in his opinion the use of preservatives, even in milk, under certain conditions, was in the public interest.

5. Dr. Attfield found, from experiments upon himself, that pharmacopœial doses of boric acid taken with his meals, had no appreciable action upon the digestion of his food. He found also that salicylic acid did not interfere with digestion.

6. Experiments on digestion in glass vessels were concerned with formic aldehyde, borax and boracic acid. Speaking generally, the results of these experiments may be regarded as showing that each of these substances had a retarding effect upon certain digestions; this amounting in the case of strong solutions of formaldehyde, to marked inhibition.

7. Experiments on animals (kittens) gave contradictory results.

8. The evidence was contradictory as to the harmfulness of copper 'greening' in peas and other vegetables.

The general conclusions of the committee are contained in the paragraphs numbered 103 to 135 of the Report to Parliament, and are exceedingly interesting and important.

Upon these conclusions are based the following recommendations:—

### RECOMMENDATIONS.

(*a.*) That the use of formaldelhyde or formalin, or preparations thereof, in foods or drinks, be absolutely prohibited, and that salicylic acid be not used in a greater proportion than 1 grain per pint in liquid food, and one grain per pound in solid food. Its presence in all cases to be declared.

(*b.*) That the use of any preservative or colouring matter whatever in milk offered for sale in the United Kingdom be constituted an offence under the Sale of Food and Drugs Acts.

(*c.*) That the only preservative which it shall be lawful to use in cream be boric acid, or mixtures of boric acid and borax, and in amount not exceeding 0·25 per cent expressed as boric acid. The amount of such preservative to be notified by a label upon the vessel.

(*d.*) That the only preservative permitted to be used in butter and margarine be boric acid or mixtures of boric acid and borax, to be used in proportions not exceeding 0·5 per cent, expressed as boric acid.

(*e.*) That in the case of all dietetic preparations intended for the use of invalids or infants, chemical preservatives of all kinds be prohibited.

(*f.*) That the use of copper salts in the so-called 'greening' of preserved fruits be prohibited.

(*g.*) That means be provided either by the establishment of a separate court of reference or by the imposition of more direct obligation on the Local Government Board to exercise supervision over the use of preservatives and colouring matter in foods, and to prepare schedules of such as may be considered inimical to the public health.

Dr. TUNNICLIFFE, while agreeing on all other points, took exception to the prohibition of the use of copper in colouring vegetables, holding that in a proportion not exceeding half a grain of metallic copper per pound the presence of copper is quite harmless.

The evidence heard before this committee was concluded May 14, 1900, and it may be safely regarded as a full statement of the case to that date.

In the abstracts which follow I have sought to give an account of work done upon this subject since the date mentioned; and, in a few cases, to do this for important work which was not brought to the notice of the committee.

LEO. GOLDSMITH (thesis for B. Sc. degree. Abstract by Prof. Mayberry in Jour. Am. Ch. Soc., 1897, p. 889) made several series of experiments on the digestion of blood fibrin in presence of alum, boric acid and formalin. The results are summarized as follows:—'While all the substances tested show some influence on the digestive action of pepsin only alum exhibits a marked effect.'

E. LABORDE (Jour. farm. Chim. 1899, 484. Through the Analyst, 1900, 154).

Small quantities of isobutyl alcohol, glycerol and malic acid favoured peptic digestion; also methyl alcohol in very slight degree; ethyl and propyl alcohols, lactic and tartaric acids and mannitol and glucose on the other hand retarded peptic digestion.

With trypsin (pancreatic digestion) methyl and isobutyl alcohols, glycerol and glucose accelerated, while ethyl and propyl alcohols, lactic, malic and tartaric acids and mannitol, retarded the process.

OTTO and CHARLES W. HEHNER (Analyst. 1902, 173) give the results of experiments which show that 'salivary action is prevented by a solution containing 0·04 per cent of sodium fluoride, or its equivalent in ammonium fluoride, and that as little as 0·02 per cent solutions of fluoride greatly interfere with peptic digestion.'

WALDEMAR KOCH (Am. Jour. Physiol., 325). The action of formaldehyde does not depend on active oxygen. Yeast made to grow anœrobically is killed by it in 0·05 per cent solutions, but in 0·005 per cent solutions is unaffected. In cases of tryptic digestion, where the presence of formaldehyde has been observed to interfere with digestion, the reason may be discovered in the fact that the formaldehyde acts upon the proteids and renders them indigestible.

H. LEFFMANN (Journ. Franklin Institute, 1899–97. Through 'The Analyst,' 1899, 102).

From the results of a large number of experiments on the artificial digestion of arrowroot starch, the author concludes that 'beta-naphthol is injurious to malt-diastase, but does not seriously affect the starch-converting capacity of taka-diastase or pancreatic extract. Boric acid, borax and boroglyceride interfere but little with either starch or proteid digestion. Salicylic acid interferes with the action of most of the enzymes, especially those that convert starch, but does not seriously affect proteid digestion. Sodium benzoate has no appreciably injurious influence on any of the enzymes. Sodium fluoride interferes but little with the digestion of starch, but sodium silico-fluoride has a considerable influence on pancreatic extract.

In his opinion, if the use of any preservative is to be permitted in food, boric acid and sodium benzoate are the least objectionable since they appear to have less tendency to disturb the digestive functions than the other preservatives commonly employed.

F. BERLIOZ (Chem. Zeit. 1900, 416)—The author's experiments confirm the statement of Nencki, that saccharin, at least in small amounts, does not interfere with gastric or pancreatic digestion.

LEBBIN and KALLMAN (Zeits. offentb. Chem. 1901, 324)—From numerous experiments carried out on animals and on human beings, the authors have come to the conclusion that our present notions as to the toxicity of normal sulphites are wholly erroneous. With acid sulphites, however, the action is quite different, for most of them are as corrosive as free acids.

The following medical testimony regarding the use of milk containing preservatives, was given in a case brought before the English courts, and is reported from the British Food Journal, 1901, p. 110.

Dr. CHARLES JACKSON, medical officer of health for Fulham, 'had seen cases where children using milk containing boracic acid, exhibited serious digestive disturbances.'

Dr. L. B. DIPLOCK said, 'four years ago he had attended a large number of children suffering from marasmus, and on testing the milk with which they were fed, he found in each case that it contained boracic acid. Upon the infants being fed on pure milk direct from the cow, they recovered without the aid of any medicine, yet before he discovered the cause of the symptoms several of the infants died.'

The following notes on the use of boric acid and its salts are taken from the Zeit. für Untersuch. der Nahr. und Genussmittel, 1902, 678-682 (through 'Analyst,' 1902, 271).

E. ROST 'As the antiseptic action of boric acid is small, comparatively large quantities are necessary to preserve articles of food, and it is quite possible for a person to take as much as 3 grammes daily in his ordinary food. Meats, sausages, milk, butter, margarine, white and yolk of egg, fish, caviare, shellfish, &c., are frequently preserved by the action of boric acid. The author found 3·87 per cent. in dry salt meat and 2·8 per cent. in shrimps. Boron compounds are stated to have no specific action on the enzymes of the stomach and intestines, except as regards their acid or alkaline properties. Borax retards to a small extent the coagulation of milk by rennet; the addition of borax to milk especially when the latter is intended for infant's food, is therefore injurious. Large doses were found to cause local irritation and inflammation in dogs, cats and rabbits, and also affected the action of the bowels. In two experiments on men it was found that doses of 1, 2 and 3 grammes of boric acid retarded the assimilation of albuminoids, the nitrogen contents of their urine being determined hourly before and after taking the boric acid. By taking the temperature of various dogs fed on borated meat, it was demonstrated that assimilation of the food was delayed. Experiments on other dogs showed that only large doses caused a loss of corpuscular albuminoids. It may be here mentioned that no essential difference was noticed between the action of boric acid and borax. A striking loss of weight in the animals was noticed. As this was not due to destruction of albumen or loss of water, it must be put down to oxidation of fat. Apparent increase in the digestion of albumen, shown when very large doses of borax were given, was due to the 'salt' action of the borax, similar results being exhibited by large doses of common salt and potassium nitrate. A large consumption of water prevented these effects.

'Assimilation experiments in the presence of boric acid were carried out on four assistants. During a preliminary period of 5 to 17 days the men were brought into a state of 'nitrogen equilibrium' followed by administration of boric acid (3 grammes per diem) for 12 days. Two of the men then, for a time received no boric acid, and afterwards underwent a second treatment. Finally, some days were devoted to studying the after symptoms of the experiments. Two of the men showed a loss of weight due to loss of fat. The final observations also showed less secretion of urine and absorption of food materials. The two other assistants also showed a loss of weight. These two latter were also chosen for Rubner's experiments (see below) in which the amounts of expired carbon dioxide and water were determined. One of them diminished so suddenly in weight after taking 3 grammes of boric acid daily, that the experiment had to be discontinued. The weight of the other also decreased, but increased when the boric acid was discontinued, and fell again when the latter was readministered. It was not demonstrated by the above experiments, that boric acid affected the appetite. No influence upon health and appetite were noticeable. Boric acid was not found by the author to influence the temperature, blood pressure or kidneys. As the elimination of boric acid by the urine takes from 8 to 14 days, its action is probably cumulative. The author comes to the conclusion that the use of boron compounds in food should be forbidden.'

RUBNER.—According to the author, who comes to the conclusion after numerous experiments, boric acid has an important latent action on the digestive process. Not only the digestive organs themselves, but the whole alimentation is affected. The change produced, which may amount to a loss of 22 per cent. of energy and 30 per cent. of the utilization of nitrogen free food, is a very important fact, and undoubtedly means injury to health, as the amount of fat in the body may be of the greatest importance, and the reduction of the fat must be followed by a rapid fall in albuminoids. Serious results may follow in infant feeding, to invalids, old people or convalescents by borated foods.

R. O. NEUMANN.—The experiments carried out by the writer on himself consisted of a preliminary period of 4 days, during which various observations were taken; then 10 days with daily doses of 3 grammes of borax, followed by 4 days without borax; and concluding with daily doses of 5 grammes of borax for 3 days. During the first period nitrogen equilibrium existed; the secretion of nitrogen decreased during the first borax treatment, also in the intermediate 4 days, but was not further diminished by the larger doses of borax. His weight fell 1,200 grammes in seven days of the borax period. The flow of urine was somewhat increased, and boric acid could be detected for 18 days after the last dose of borax had been taken.

A. HEFFTER made four series of experiments on himself. alternately fasting for 18 to 20 hours, and then feeding on milk and eggs for 48 hours. In two of the series he used food without borax; in the other two he used 1 and 4 grammes borax daily. The boric acid was found to increase the solids and nitrogen in the excreta, probably due to the diminished absorption of albuminoids as a result of the injurious effect of the boric acid on the mucous membrane of the intestines. The conclusion is that boric acid is not without objection when used as a preservative.

G. SONTAG found by experiment that 3-gramme doses of boric acid required 5, 8 and 9 days, respectively, for elimination by the urine, in the cases of three healthy individuals.

A. WEITZEL.—Experiments on the coagulation of milk by rennet, in presence of various substances, as follows:—Group (1) Alkaline: Borax, sodium hydroxide, sodium carbonate and sodium bi-carbonate. (2) Salts capable of precipitating lime: Sodium oxalate, sodium fluoride and sodium oleate. (3) Other salts having an alkaline reaction: Sodium sulphite, salicylate, benzoate, propionate, acetate and formate. (4) Neutral salts: Sodium chloride, lithium chloride, sodium nitrate, perchlorate, tartrate, sulphate, ammonium sulphate and magnesium sulphate. (5) Acid salts: Sodium hydrogen tartrate, sodium hydrogen sulphate and sodium persulphate. (6) Acids: Boric, carbon dioxide, oxalic, benzoic, salicylic, protocatechuic and gallic. (7) Formaldehyde, saccharin and cane sugar.

The following results were obtained:—

(1) Borax retarded the coagulation when present in only small quantities (0·01 to 0·04 per cent), and the amounts usually employed (1 gramme per litre of milk) stopped the action of the rennet altogether. All other alkaline salts acted similarly.

(2) Coagulation was checked by those salts which precipitated the lime compounds. When the reaction became alkaline, the influence of alkalinity also showed itself.

(3) The neutral salts generally had a retarding action. Some (sodium and lithium chloride), principally in concentrated solution, more feebly when present in small quantities. Magnesium sulphate, in both concentrated and dilute solution, had considerable influence.

(4) Small quantities of the acids aided the coagulation. After carbon dioxide, boric acid had the most feeble action. The acid salts acted in the same manner as the acids.

(5) The action of formaldehyde was so powerful that it must be considered as a direct poison to the rennet enzyme. Saccharin in small quantity had little influence, but stronger solutions greatly hindered the coagulation. Sugar, up to 20 per cent of the weight of the milk, had no action.

E. POLENSKE showed experimentally that fresh and smoked hams, when packed in borax, dry, for periods of three and four weeks, absorbed into the interior of the ham quantities of borax varying from 0·076 to 4·05 per cent.

L. PORTES AND A. DESNOULIÈRES, (Ann. Chim. Anal. Appl. 401) " have found out, by the examination of fresh strawberries, that salicylic acid, probably as the methyl ester, is a normal constituent of this fruit. The amonnt in the fresh berries is about 1 mgr. per kilog. (i.e. about 1 part per million or 0.0001 per cent.)"

E. O. V. LIPPMAN (Chem. Zeit. 1902; 465) found a deposit in a vacunm pan, which had been used for concentrating lemon juice. On analysis this gave about 0.5 per cent of boric acid. Various commercial samples of lemon juice were then examined, as well as lemons and oranges, and in nearly every instance strong boric acid reactions were obtained. In the lemons, boric acid was detected both in the juice and in the rind.

H. A. WEBER (Amer. Chem. Journal, 1896, 1092) made a series of experiments to determine the influence of coal tar colouring matter on the digestion (by pepsin and pancreatin) of blood fibrin. He reaches the following conclusions:—

*Oroline yellow* ("acid yellow" or "fast yellow" of the trade) has a marked and injurious effect on peptic digestion.

*Saffoline* (acridine red) slightly retards peptic digestion, but the author considers its effects to be practically *nil*.

*Magenta*—does not appear to interfere with peptic digestion.

*Oroline yellow*—does not retard pancreatic digestion.

*Saffoline*—has a strong retarding effect on pancreatic digestion.

*Magenta*—acts like saffoline towards pancreatic digestion.

*Methyl Orange*—acts like saffoline and magenta in retarding pancreatic digestion.

From the examination of these four colours, it appears that while none interfere with both peptic and pancreatic digestion, all interfere with one or the other, and are therefore very undesirable in food or drink.

*Frentzel.* (Zeit. für. Untersuch. der. Nahr. und Genussmittel, 1901; 968.)—In this paper are given the results of a considerable number of experiments, consisting in feeding rabbits, dogs and human beings with food mixed with the colours "mandarin" (obtained by diazotizing sulphanilic acid and B. naphthol) and "metanil yellow" (prepared by diazotizing meta-benzene-sulphonic acid and diphenylamine). The conclusions arrived at are that the colours can scarcely be considered poisonous in the small quantities in which they are used in foods. Long continued, large doses, however give rise to some injurious effects: but this quantity is never, in the natural course of things, even approximately reached.

*Chlopin.* (Zeit. für Untersuch. der Nahr. und Genussmittel, 1902; 241) finds that "metanil yellow" is harmless, even when given in daily doses of 2 to 3 grammes to dogs, and 0·2 gramme to human beings. On the other hand he does not agree with the statement of Frentzel that "mandarin" is innocuous in moderate quantities. Given in daily doses of 2 grammes to a dog it caused uneasiness, vomiting and diarrhoea. The author himself took 0·2 gramme, and the symptoms were so alarming (dizziness, headache, &c.) that the substance had to be removed from the system by means of a purgative.

The following concise summary of Food Laws, as regards preservatives, is taken from a bulletin issued by the United States Department of Agriculture, through the *Jour. Soc. Chem. Industry*, 1901, p. 774:—

'Prohibition of the use of chemical preservatives and aniline dye stuffs as colouring agents for liquors is almost universal, while the employment of all foreign colouring matter is often prohibited. The use of chemical preservatives and foreign colouring matter with beer is usually prohibited. The sale of foods containing saccharin, sucrol, and similar preparations is prohibited in Belgium, France, Germany, Italy and Roumania. The importation of saccharin, except for medicinal use and under prescribed conditions, is prohibited by Belgium and Greece. All countries permit the dyeing of confections and similar articles which are themselves colourless, but are customarily coloured artificially. Belgium permits mustard to be coloured artificially when properly labelled. Salicylic acid and boric acid have been used so much more commonly than other preservatives, that legislation is usually directed against them, whilst local bodies often extend the prohibitions to benzoic acid and other substances as they come into use.

'The sale of foods containing preservatives is prohibited in Austria, France, Hungary and Roumania, and that of beverages containing preservatives in Belgium, Germany and Switzerland. The addition of salicylic acid to food is prohibited in France. Holland does not not permit the sale of beer containing salicylic acid, and Spain forbids its addition to wine. Italy permits the addition of 0·2 per cent. of boric acid to butter, but forbids the use of other preservatives.'

While I cannot say that I have, in the preceding pages, given a resumé of all the important work that has been done upon preservatives and colouring matters, I believo that I have referred to and summarized all the important researches which have ceme under my notice. It will, I think, be conceded by anyone who reads the subject carefully, that the balance of evidence is decidedly against the use of any preservative in food. At the same time it must be granted that there are degrees of danger to health among the chemical substances which find favour as preservatives among manufacturers and vendors of food; and it may be that, in certain cases, less harm may result from the preservative than would result from deterioration of the food-stuff, were this kept for a length of time without an antiseptic. In order to decide the question as to whether, in certain cases, such as long voyages, travelling in out-of-the-way regions, supplying stores to soldiers on the march, mining camps, &c., as well as in the distribution of food-stuffs to the great centres of population, far removed from the places where such foods are produced, it might not be preferable to employ chemical preservatives rather than consume food which had suffered natural decomposition, or pay the high prices necessitated by quick transit, or such costly methods as cold storage, hermetical sealing, &c., it is evident that experiment must determine the extent of the injury to health which results from the use of food preserved from decomposition by antiseptic chemicals.

Experiments having this object in view, were recently made in the Imperial Health Office at Berlin; but the most interesting series of such experimental work is only now being inaugurated at Washington, D.C., under the management of the Bureau of Chemistry, of which Dr. H. W. Wiley is chief. I have just received the following communication regarding this matter from my friend Dr. W. D. Bigelow, chief of the Food Laboratory at Washington: 'The experiment is being undertaken very seriously, and on a somewhat extensive scale. In fact we consider it the most important inquiry we shall have on hand this year. About a dozen men, almost all from the Department of Agriculture, have volunteered, and will be divided into two equal lots, one of which will eat preserved food, while the other will receive only food that is known to be pure. The conditions will be controlled as carefully as possible, and the presence of nitrogen, phosphoric acid, and energy expressed as heat of combustion, will be determined. The preservative used will be determined in the food, as well as in the excrement and urine, and careful observations will be made daily regarding the physical conditions of the men. A "clinical" sheet will be kept for each man. The work will be very similar to that recently conducted by the Imperial Health Office at Berlin, but will be more extensive and will also differ from it in the fact that we shall employ largely young men of scientific training instead of labourers. We are just entering upon this work now. The first table will be started the beginning of next week, and the analytical work will begin early in December.'

The above extract is from a private letter, dated 19th instant; so that when this memorandum is before the public, the experiment will be well in progress. I am sure that everyone interested in the subject with which I have been dealing will await with eagerness the results of Dr. Wiley's investigation. And in the meantime, until we are made aware of the amount of injury which may ensue from the use of 'preserved' food, the part of wisdom will be to eschew, as far as possible, every article which we suspect to be so treated.

As to artificial colouring matters, we have seen that the British Food Commission did not find itself justified in making a decided pronouncement. These articles are employed in such minute amounts that it is naturally very difficult to obtain certain information as to their specific physiological effects, when used along with food. The experiments of Weber, Frentzel and Chlopin, show that the most commonly occurring colouring matters interfere with digestion, but in all their experiments the quantities employed were very largely in excess of any that occur in food stuffs. I find that the red colour given to ketchup by coal-tar dyes is so different from the natural colour of a home-made ketchup, that I am surprised at the saleability of the artificial article. The demand for a deep yellow colour in cheese is another example of false taste on the part of the public. It seems to me rather surprising that the highly coloured articles of food should not, by that very fact, warn purchasers against them.

A. McGILL.

RESULTS of examining 27 samples

| Date of Collection. | Description of Sample. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher, as given by Vendor. | Serial Number. | Departmental Number. |
|---|---|---|---|---|---|
| 1902. | | | | | |
| July 31 | Lime Juice, bottled by vendor. | A. W. Puddin, Charlottetown, P.E.I. | Simpson Bros., Halifax, N.S.. | 1 | 4310 |
| " 31 | " " .. | Stewart & Gates, Charlottetown, P.E.I. | " " .... | 2 | 4315 |
| " 30 | Lime Juice............ | A. Hendry, Winnipeg, Man. | Blackwood Bros., Winnipeg, Man. | 3 | 17421 |
| " 31 | " ........ ..... | The A. McDonald Co..... | The Bole Drug Co., Winnipeg, Man. | 4 | 17422 |
| " 23 | " bottled by furnishers................ | E. C. Brown, St. John, N.B. | Simpson Bros., Halifax, N.S.. | 5 | 17846 |
| " 25 | West India Lime Juice, from bulk. | W. C. R. Allan. ... .... | Hattie & Mylius, Halifax, N.S. | 6 | 17848 |
| Aug. 6 | Lime Juice, Sovereign Brand. | F. W. Davison, Wolfeville, N.S. | Simpson Bros., Halifax, N.S.. | 7 | 20228 |
| " 7 | Lime Juice, Sterling Brand. | Dimock Bros., Windsor, N.S. | Hattie & Mylius, Halifax, N.S. | 8 | 20229 |
| July 25 | Lime Juice.. ......... | W. McMillan, Brockville, Ont. | Turner & Co., Toronto.... .. | 9 | 21234 |
| " 25 | " .... ......... | J. A. Johnston, Brockville, Ont. | F. A. Lytle & Co., Toronto.... | 10 | 21236 |
| " 25 | " .............. | Peoples' Supply Co., Toronto. | Crown Manufacturing Co., Toronto. | 11 | 21238 |
| " 25 | " ...... . .... | Swan Bros., Toronto .... | Simpson Bros. & Co., Halifax, N.S. | 12 | 21239 |
| " 28 | " ......... .... | Geo. Wagg, Vancouver, B.C. | Kelly, Douglas & Co., Vancouver, B.C. | 13 | 21677 |
| " 30 | " .............. | F. Filion, Vancouver, B.C. | West India Lime Juice Co., St. Thomas, W. I. | 14 | 21682 |
| " 23 | Lime Juice made by Bottger & Co., England | J. W. Irwin, Clinton, Ont. | Rose & Laflamme, Montreal... | 17 | 22038 |
| " 23 | Crown Lime Juice...... | John S. Roberts, Seaforth, Ont. | Lyman Bros. & Co., Toronto .. | 18 | 22042 |
| " 22 | Lime Juice............ | J. C. Downs & Co., Stanstead, P.Q. | Brayley & Sons, Montreal..... | 19 | 23334 |
| " 24 | " .... ......... | Pagnuelo Freres, St. Hyacinthe, P.Q. | Kenneth Campbell Co., Montreal. | 20 | 23338 |
| | Lime Juice, Crown Brand | Obtained in Toronto...... | ... ... .................. | 21 | Spec'l |
| | " Montserrat... | Purchased in Ottawa .... | ........... ................ | 22 | " . |
| | " Standard Brand. | " .. . | ... .................... ... | 23 | " . |
| | Lime Juice, Dominion Brand. | " .... | ......... . . ............ | 24 | " . |
| | Lime Juice, West Indian Brand. | " .... | ..... ......... ............ | 25 | " . |
| | Natural Lime Juice, as imported. | .... .... ..... ....... | .... .................. .. .. . | 26 | No. 1. |
| | " " .. | ... ..... ... .. ...... | ....... ................... | 27 | " 2 |
| | " " .. | ......... .. .... ...... | ........................ | 28 | " 3 |
| | " " .. | .... .... ........ | Clarified in Halifax.. ....... | 29 | " 4 |

of Lime Juice, by A. McGill.

| Specific Gravity. | Dissolved Solids. Dry at 100° c. | Acidity per 100 cc. In terms of normal soda. | Acidity as Citric Acid. | Organic Acids, in terms of normal soda. | Organic Acids, calculated as Citric Acid. | Combined org. acids as Citric. | Optical rotation in 2 dm. tube. | Phosphoric Acid, as $P_2O_5$ per 100cc. | Alcohol, as proof spirit. | Preservatives. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p. c. | p. c. | c. c. | p. c. | c. c. | p. c. | p. c. | S.V. Scale. | p. c. | p. c. | | |
| 1·0289 | 5·36 | 84·0 | 5·88 | 90·8 | 6·36 | 0·48 | 0·0 | None. | None. | None .. | |
| 1·0386 | 8·86 | 108·4 | 7·59 | 116·0 | 8·12 | 0·53 | 0·0 | " . | 3·03 | Salicylic acid. | |
| 1·0237 | 5·59 | 74·4 | ... | 77·6 | .... | ..... | +1·2 | " . | 1·74 | " .. | |
| 1·0198 | 4·46 | 63·6 | 4·45 | 66·0 | 4·62 | 0·17 | 0·0 | " . | 0·23 | None... | Contains 0·029 $SO_3$. |
| 1·0262 | 7·70 | 79·6 | 5·57 | 82·4 | 5·77 | 0·20 | 0·0 | " . | 0·70 | " .. | |
| 1·0335 | 8·52 | 116·0 | 8·12 | 122·4 | 8·57 | 0·45 | 0·0 | " . | 2·09 | Salicylic acid. | |
| 1·0323 | 7·48 | 102·5 | 7·18 | 107·2 | 7·50 | 0·32 | 0·0 | " . | 1·74 | None... | |
| 1·0384 | 8·47 | 106·9 | 7·48 | 114·8 | 8·04 | 0·56 | 0·0 | " . | 0·12 | " .. | |
| 1·0330 | 6·43 | 78·0 | ...... | 44·8 | ...... | .... | 0·0 | 1·28 | 1·51 | Salicylic acid. | Contains 0·120 HCl, and tartaric acid. |
| 1·0222 | 4·91 | 66·0 | .... | 64·8 | ...... | .... | +2·8 | 0·14 | 1·04 | " .. | Contains tartaric acid. |
| 1·0316 | 5·70 | 68·4 | .... | 32·8 | .... | .... | —1·4 | 1·40 | 0·70 | " .. | Contains 0·141 HCl, contains tartaric acid and is coloured by a green dye. |
| 1·0379 | 8·29 | 113·2 | 7·92 | 119·6 | 8·37 | 0·45 | 0·0 | None. | 0·35 | None... | |
| 1·0243 | 4·69 | 76·4 | ... | 78·8 | ...... | .... | 0·0 | Trace. | 0·58 | " .. | |
| 1·0353 | 7·97 | 105·3 | 7·37 | 110·0 | 7·70 | 0·33 | 0·0 | " . | 0·23 | " .. | |
| 1·2421 | 51·74 | 44·0 | 3·08 | 42·0 | 2·94 | None. | —60·0° | None. | 0·70 | Salicylic acid. | Contains much sugar. |
| 1·0352 | 7·64 | 114·8 | 8·04 | 120·4 | 8·43 | 0·39 | 0·0 | " . | 0·58 | None... | |
| 1·0417 | 9·68 | 118·8 | 8·32 | 124·8 | 8·74 | 0·42 | 0·0 | " . | 0·35 | " .. | |
| 1·0292 | 8·08 | 101·6 | 7·11 | 108·0 | 7·56 | 0·45 | 0·0 | " | 3·99 | " .. | |
| 1·0328 | 6·27 | 70·3 | .... | ..... | ... | . | —1·0 | 1·264 | 1·16 | ........ | Contains tartaric acid. |
| 1·0318 | 7·94 | 98·5 | 6·90 | 102·5 | 7·18 | 0·28 | 0·0 | None. | None. | | |
| ..... | 2·14 | 28·4 | 1·99 | 29·2 | 2·04 | 0·05 | 0·0 | " . | | | |
| .... | 8·22 | 110·8 | 7·76 | 115·2 | 8·06 | 0·30 | 0·0 | " . | | | |
| ...... | 8·24 | 113·6 | 7·95 | 116·0 | 8·12 | 0·17 | 0·0 | " . | | | |
| 1·0398 | .... | 116·0 | 8·12 | 121·6 | 8·51 | 0·39 | 0·0 | " | | | |
| 1·0393 | ..... | 110·0 | 7·70 | 116·8 | 8·17 | 0·47 | 0·0 | " . | | | |
| 1·0363 | ..... | 105·0 | 7·35 | 108·4 | 7·59 | 0·24 | 0·0 | " . | | | |
| 1·0370 | ...... | 108·0 | 7·56 | 110·0 | 7·70 | 0·14 | 0·0 | " . | | | |

### RESULTS of Examining 26 samples of

| Date of Collection. | Name and Address of Vendor. | Name of Article as sold and Name of Furnisher when given by vendor. | Serial Number. | Departmental Number. | Name of Brand. |
|---|---|---|---|---|---|
| 1902. | | | | | |
| July 31 | J. D. McLeod, Charlottetown, P.E.I. | Tomato Catsup | 1 | 4313 | Mrs. Jones' |
| " 31 | " " | Tomato Ketchup | 2 | 4314 | Heinz |
| " 29 | J. Mullen, Winnipeg, Man. | Catsup | 3 | 17419 | Ice Castle |
| " 29 | W. W. Stone " | Chutney Ketchup | 4 | 17420 | Chutney Ketchup |
| " 29 | C. D. Phelps, St. John, N.B. | Tomato Ketchup | 5 | 17852 | Beefsteak |
| " 29 | P. Nase & Son, St. John, N.B. | Tomato Ketchup. Deerborn & Co., St. John, N.B. | 6 | 17853 | Bar Harbour |
| Aug. 6 | DeWolfe & Lamont, Kentville, N.S. | Tomato Ketchup | 7 | 20227 | Butler's |
| " 7 | J. Scott & Co., Halifax, N.S. | Mushroom Catsup | 8 | 20232 | Mushroom |
| July 24 | J. Downeys, Belleville, Ont. | Tomato Catsup | 9 | 21229 | Queen |
| " 24 | Hovey & Son, Coburg | " | 10 | 21231 | Monarch |
| Aug. 5 | A. Paquette, Montreal | " | 11 | 21241 | English Spiced |
| " 5 | Richard et Frère, Montreal | " | 12 | 21242 | Tomato Ketchup |
| July 28 | Geo. Wagg, Vancouver, B.C. | Ketchup. Paupe Vinegar Works, California | 13 | 21676 | Gold Medal, |
| " 28 | H. Albert " | Ketchup | 14 | 21678 | Pure Catsup |
| | | | 15 | 21709 | Pure Gold |
| | | | 16 | 21710 | |
| July 22 | Sturday & Co., Goderich, Ont. | Tomato Catsup. Pure Gold Mfg. Co., Toronto. | 17 | 22035 | Club |
| " 22 | J. W. Irwin, Clinton, Ont. | Catsup | 18 | 22037 | Anglo-Saxon Eclipse |
| " 21 | A. L. Brown & Son, Lennoxville, Que. | Catsup. Pure Gold Mfg. Co., Toronto. | 19 | 23329 | Pure Gold |
| " 21 | D. P. Matheson & Co., Lake Megantic, Que. | Ketchup. Tip Top Ketchup Co., Cincinnati, O. | 20 | 23332 | Butler's |
| | | | 21 | Special. | Pure Gold |
| | | | 22 | " | Homemade |
| | | | 23 | " | " |
| | | | 24 | " | Stirling |
| | | | 25 | " | Snider |
| | | | 26 | " | Club |

Ketchup or Catsup by A. McGill.

| Manufacturer, as given on the label. | Coal Tar Dye Stuff. | Dry Solids, per cent. | Preservative. | | | Acidity per 100 cc. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | Sulphurous Acid or Sulphites. | Salicylic Acid. | Benzoic Acid. | Stated in cc. normal soda. | Calculated to Acetic Anhydride. | |
| Williams Bros. & Charbonneau, Detroit. | Present. | 24·4 | Doubtful. | None. | Present. | 17·2 | 0·877 | |
| H. J. Heinz Co., Pittsburg. | " | 19·2 | None. | " | " | 18·0 | 0·918 | |
| J. W. Windsor, Montreal and St. Eustache. | " | 12·3 | " | Present. | None. | 15·6 | 0·796 | |
| Blackwood Bros., Winnipeg | None. | 18·3 | Trace. | " | " | 42·8 | 2·183 | |
| J. Campbell Preserve Co., Camden, N.J. | Present. | 21·3 | Present. | None. | Present. | 20·0 | 1·020 | |
| .... .... .............. | " | 12·7 | None. | " | " | 11·4 | 0·581 | |
| Tip-top Ketchup Co., Cincinnati. | Doubtful. | 19·5 | Trace. | " | Trace. | 14·4 | 0·734 | |
| Crosse & Blackwell ..... .. | None. | 17·2 | None. | " | None. | 1 ·8 | 0·551 | |
| Belleville Canning Co ... | Present. | 19·3 | Present. | " | Present. | 21·4 | 1·091 | |
| J. M. Lowes Co., Toronto.. | None. | 19·8 | None. | Present. | None. | 16·2 | 0·826 | |
| Montreal Canning and Preserving Co. | Present. | 8·7 | Traces. | None. | Present. | 20·8 | 1·081 | |
| H. Bourque, Montreal. ... | " | 7·6 | None. | " | None. | 23·0 | 1·380 | |
| .... ........... .... ...... | " | 9·1 | " | Present. | " | 12·0 | 0·612 | |
| VanCamp Packing Co., Indianapolis. | " | 23·5 | Traces. | " | " | 12·0 | 0·612 | |
| . ...................... | " | 25·3 | Present. | " | ....... | .... | ..... | |
| Garden City Canning Co., St. Catharines, Ont. | None. | 18·0 | Trace. | None. | ........ | ... | ..... | |
| ... ............. .. .. | Present. | 25·7 | Present. | " | Present. | 23·6 | 1·204 | |
| P. M. Card, Guelph... .. . | Doubtful. | 35·4 | " | Present. | None. | 33·6 | 1·714 | |
| .... ..... ........... | Present. | 24·0 | " | " | " | 13·6 | 0·694 | |
| See No. 7 ........... ... | Trace. | 18·2 | " | None. | " | 16·2 | 0·826 | |
| ... .. .... ........ . .. | Present. | 29·7 | Trace. | " | Present. | 28·0 | 1·428 | |
| Mrs. G., Ottawa......... | None. | .... .. | None. | " | None. | ...... | .... .. | Samples 22 and 23 were furnished by friends for purposes of studying reactions. |
| V.—- " .... .... | " | 30·2 | " | " | " | .... | ... | |
| T. A. Lytle & Co., Toronto. | Present. | 18·3 | Present. | " | Doubtful. | 21.6 | 1·102 | |
| Snider Preserve Co., Cincinnati, O. | " | 19·3 | None. | " | Present. | 11·2 | 0·571 | |
| ..... . ........ ........ | " | 15·5 | Present. | " | Doubtful. | 22·2 | 1·132 | |

## APPENDIX C.

## BULLETIN No. 84,—CEREAL BREAKFAST FOODS.

OTTAWA, December 17, 1902.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—I beg to transmit herewith a report by Mr. A. McGill, M.A., assistant to the chief analyst, on Cereal Breakfast Foods, together with a tabulated statement of the analytical results obtained by him in this laboratory, with the assistance of Miss E. Davidson, Miss S. E. Wright, Mr. Alphonse Lemoine and Mr. J. G. A. Valin. The statement also shows the nature and origin of the different samples examined.

I have the honour to be, sir,
Your obedient servant,

THOMAS MACFARLANE,
*Chief Analyst.*

## LABORATORY OF THE INLAND REVENUE DEPARTMENT.

OTTAWA, December 10, 1902.

THOS. MACFARLANE, Esq., F.R.S.C.,
Chief Analyst Inland Revenue Department,

SIR,—I beg herewith to submit a report of my work on Breakfast Foods.

These samples, as you are aware, were not collected and examined because of any suspicion regarding their wholesomeness or genuineness, for they were believed to be as their analysis proves them to be, nutritious and palatable foods. In view, however, of the high prices at which they are sold, and of the extravagant claims put forth by their manufacturers as to their digestibility, nutrient power, &c., there exists a wide-spread demand for information as to what they really are, and how much of all the value claimed for them they really possess.

The use of oatmeal, cracked wheat, cornmeal, &c., as materials for porridge, goes back as far as history, but the use of so-called prepared foods, is a thing of very recent date. Most of these foods claim to be partly or wholly cooked, and in view of the practical indigestibility of uncooked starch, it is matter of high importance that the purchaser should know just how much of truth there is in the claim. The further inquiries as to relative richness in nitrogen, digestibility of the nitrogenous material, proportion of salts, &c., are scarcely of secondary importance, particularly in cases where the manufacturer promises a 'perfect food,' i.e., a food capable of satisfying every demand of the system.

Unfortunately our knowledge of the different forms in which nitrogen occurs in cereals is far from perfect; and the excellent work done in recent years by chemists in this field, has been achieved by methods of operation too involved and too time-consuming to render them available in the laboratory of the food-analyst. The points of difference in quantity and quality which have been demonstrated, among others, by Osborne and Voorhees (*See* Journal Am. Chem. Society, 1893, and succeeding years) between the proteids of different cereals, have doubtless a very important relation to the values of these cereals for human food. But the differences in question are not available by any practicable methods of working, for the use of the analyst. It is even too much to say that our knowledge of the carbo-hydrates of cereals approaches completeness ; while the relative values of these materials in nutrition is still another aspect of the question, that must be dealt with by the physiological chemist.

Available methods for the proximate analysis of cereals, enable us to discriminate so far as indicated in the analytical tables furnished herewith. The work might even be carried somewhat further, since fairly well accredited methods for the estimation of pentosans, among the carbohydrates, and amidic bodies, among the azotized components, have been worked out. Pressure of work has, however compelled me to leave this task less complete than I should wish.

The earliest work on the examination of *Prepared Cereal Foods* which has come under my notice, is that of Slosson, published in Bull. 33 of the Wyoming Experiment Station in 1897. In addition to most of the usual determinations, Mr. Slosson has estimated *phosphorus*, and the following limit results for phosphorus and calorific values, are of interest :

| — | Phosphorus per cent. | | | Calories per Gram. | | |
|---|---|---|---|---|---|---|
| | Max. | Min. | Mean. | Max. | Min. | Mean. |
| From 21 samples of prepared cereal food. | ·447 | ·153 | ·321 | 4,756 | 3,660 | 4,326 |

The highest content in phosphorus, as well as the highest calorific value, are found in preparations of oatmeal, so that the popular preference for this cereal. seems to be warranted on scientific grounds.

In Part 9. of Bull. 13—U. S. Department of Agriculture, 1898, Dr. Wiley has published the results of analysis of 48 samples of Breakfast Foods. The following summary of his results has both interest and value (See pp. 1345—1349. op. cit.) :—

MEAN RESULTS ON CEREAL FOOD PRODUCTS.

From Bull. 13, part 9,—U. S. Dept., of Agriculture.

| Class of Food. | Moisture. | Fat. | Ash. | Crude Fiber. | Total Nitrogen | Carbohydrates other than fiber. | Digestible Proteids. | Calories of Combustion. |
|---|---|---|---|---|---|---|---|---|
| Indian corn products (mean of 6 samples)... ..... ............ | 12·33 | 0·58 | 0·66 | 0·67 | 1·27 | 78·51 | 24·86 | 4,360 |
| Wheat products (mean of 14 samples)... . .. . . ....... | 10·08 | 1·80 | 1·55 | 1·48 | 1·90 | 75·62 | 62·47 | 4,482 |
| Oat products (mean of 7 samples). | 7·66 | 7·46 | 1·79 | 1·20 | 2·45 | 67·61 | 51·09 | 4,671 |
| Starch and tapioca (mean of 7 samples) ..... .. .. ..... . .... | 11·29 | 0·03 | 0·14 | 0·13 | 0·06 | 88·15 | ........ | 4,160 |
| Noodles, spaghetti and macaroni (mean of 9 samples)........... | 9·66 | 0·42 | 0·78 | 0·56 | 1·92 | 77·12 | 80·53 | 4,342 |
| Barley.... ..... .. ........... | 10·92 | 0·89 | 0·86 | 0·67 | 1·20 | 80·35 | 39·20 | 4.365 |
| Miscellaneous (4 samples)...... .. | 6·41 | 1 05 | 1·06 | 0·99 | 2·05 | 78·68 | 52 04 | 4,460 |

Dr. Wiley has explained to me that the results entered in the column headed 'Digestibles Proteids,' were obtained by working with Wilson's modification of Stutzer's pepsin method—This is fully described in Jour. Soc. Chem. Industry, 1891, p. 118.

The calorific values given in the last column, were found by actual combustion. When, however, the proximate analysis of a cereal is given, the calorific value (in calories per gram) can be very closely ascertained by using the following factors:—

Pentoses, lactose, crystalized dextrose and fructose=3,750 calories per gram.

Sucrose, maltose and anhydrous lactose=3,950 calories per gram.

Starch and cellulose=4,200 calories per gram.

Proteids=5,900 calories per gram.

Fat (Ether Extract)=9,300 calories per gram. Bull. 13—part 9,—U. S. Dept., of Agriculture—pp. 1245—1249.

For the purpose of calculating the calorific value of these cereal foods, the numbers given in the accompanying analytical tables may be thus written:—(mean results are used.)

Malt Breakfast Food—

| | Per cent | | |
|---|---|---|---|
| Moisture | 9·99 | | |
| Fat | 1·03 | × 93 = | 95·8 |
| Ash | 0·56 | | |
| Proteids | 12·44 | × 59 = | 734·0 |
| Fiber | 1·05 | | |
| Dextrin | 3·24 | × 42 = | 3,265·0 |
| Starch (difference) | 71·69 | | |
| | 100·00 | | 4,094·8 calories per gram. |

The Calorific values in the following table are calculated after the manner shown.

| Sample. | Moisture. | Fat. | Ash | Proteids — Nitrogen × 6·25. | Crude Fibre. | Dextrin | Starch — By difference. | Calories per gram. | Material Soluble in cold water. |
|---|---|---|---|---|---|---|---|---|---|
| | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. |
| Malt breakfast food | 9·99 | 1·03 | 0·56 | 12·44 | 1·05 | 3·24 | 71·69 | 4094·8 | 13·00 |
| Force | 11·92 | 1·27 | 2·75 | 11·56 | 2·60 | 14·48 | 55·42 | 3845·1 | 29·60 |
| Malta vita | 11·10 | 1·25 | 3·00 | 9·88 | 3·15 | 9·26 | 62·36 | 3840·3 | 30·88 |
| Grape nuts | 9·43 | 0·58 | 1·64 | 12·00 | 2·03 | 24·87 | 49·45 | 3968·9 | 49·50 |
| Life chips | 9·90 | 1·69 | 2·60 | 9·69 | 2·90 | 12·16 | 61·06 | 3925·9 | 19·30 |
| Ralston breakfast food | 13·02 | 1·54 | 0·78 | 12·50 | 1·68 | 2·62 | 67·86 | 3911·7 | 7·50 |
| Rolled oats | 11·21 | 7·21 | 1·68 | 12·69 | 3·14 | 3·58 | 60·49 | 4242·2 | 6·19 |
| Oatmeal | 10·84 | 6·91 | 1·14 | 13·00 | 4·28 | .... | 63·83 | 4270·6 | 3·85 |
| Peameal | 10·40 | 1·33 | 2·62 | 27·56 | 1·36 | ........ | 56·73 | 4132·7 | 17·75 |
| Cornmeal common | 13·12 | 5·21 | 1·42 | 10·25 | 3·50 | ...... | 66·50 | 4029·2 | 6·30 |
| " golden | 14·90 | 2·01 | 0·58 | 8·94 | 1·18 | ........ | 72·39 | 3804·3 | 2·90 |

One is often asked the question 'Which of all these breakfast foods is the best value from the point of view of nutrition?' While a categorical reply to such a question is not possible, the data contained in this table make a conditioned answer quite possible. Provided that the article is served up in such a way as to render it fully digestible, then from a consideration alone of the energy that can be derived from it, there is very little to choose between them.

The extremes in calorific value are found respectively in oatmeal (4270·6) and golden cornmeal (3804·3). The difference between these values is only 466·3 calories, or 11 per cent. Both of these foods are sold in the 'uncooked' state. The claim of the manufacturers of the cooked, or malted foods is that by the process to which they have been subjected, the 'insoluble starch is converted into soluble maltose and dextrin'.

The last column of the above table shows to what extent this rendering the starch soluble has occurred. Thus, we find oatmeal to yield but 3·85 per cent, to cold water, while several of the prepared foods yield 20 per cent, or more to this solvent.*

Of course the chief object sought in *boiling* porridge, is to render the starch soluble; and where conditions make it difficult, or impossible to properly cook one's porridge, there is doubtless an advantage in using a material that has already undergone some change in this regard. Whether or not the high prices at which these foods are sold are sufficiently warranted by the saving of fuel and time, under ordinary conditions of domestic life, is a question to be solved by each housekeeper for himself.

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*The following attempt to explain the essential principles of nutrition in non technical language, has been made in deference to the advice of a friend, of whose opinions I entertain a high regard. I am fully aware of the dangers incident to an explanation of scientific matters by the analogical method, and I may have pressed the analogy too far in some points. I believe, however, that all that I have said is materially accurate: and shall be sufficiently rewarded if I have put the subject in such a form as to make it intelligible to non-scientific readers, so as to interest them in it, and induce them to make themselves acquainted with the more strictly technical terms in which alone the subject can be discussed to advantage.

*Work* is done whenever the tendency to rest is resisted. In this sense mere living implies work, for the beating of the heart and the flow of blood in the vessels means effort, although such effort is not conscious. The power to do work is spoken of as energy, and wherever work is done, energy is being expended. A locomotive engine in movement is an example of work being performed, and energy being expended. A man running, or walking, or even sitting still, so long as he is alive, is equally an instance of work being done, and of energy being expended. When we see an engine in movement, we know that fuel is being burnt within it: so when we see a man in movement, we know that fuel (food) is being consumed (digested) within him. The food of the engine (coal or wood) must not only be put into it, but must undergo combustion (oxidation) in the fireplace. So the fuel (food) of man must not merely be taken into his body, but must there undergo combustion (digestion) in order to furnish the energy necessary to do work. The food of man need not necessarily be taken in from *without*, since his own fat, may be consumed within him, just as the fireman of an engine, when coal is scarce, may break up the woodwork of his cab and burn it with his cushions and even his clothing in order to keep his engine going. It is evident that such a state of things could not last long; and so too of the consumption of a man's own tissues. He wastes away, and becomes mere skin and bone, and then he dies.—(ceases to go.) Not every kind of material is suitable for the nutrition of a locomotive engine, and there are degrees of value even among those forms of matter which may be used as fuel. So with man. Certain forms of matter are capable of being burnt within him to advantage, and long experience has proved that his energy is best derived from *fats, carbohydrates* and *proteids*, just as the energy of the engine is best derived from *coal, wood* or *oil*.

*Energy* may show itself in other ways than by movement; and the most notable of these other ways, is by the production of heat. A movement of what we call electricity (another form of energy) is constantly taking place in our trolley wires. When the wire breaks, and the free ends touch the roadway—which resists the passage of the electricity—tremendous heat is developed; if to the free ends of the wires carbon rods are attached, the heat and light produced constitute the arc-lamps so commonly employed in street lighting. The heat of the locomotive boiler is an expression of the energy produced by the burning of the fuel; and the heat of man's body—which is always about 98° Fah., although the temperature of the air round about him may be below zero—is an expression of a part of the energy produced by digestion of his food. It would be possible to measure energy by taking, for example, the amount that must be expended against the force of gravity in lifting a weight of one pound through a height of one foot; but in the study of digestion it is much more convenient to measure energy in

There is, however, another point of view from which these foods may be regarded, viz: their content in proteid matter. In this respect peameal excels them all. There is however good reason to believe that the proteids of the pea and bean, and of leguminose in general, are less easily digested by man than are the proteids of the cereal grains proper. Among these oatmeal takes first rank, but several of the prepared foods stand very well in this regard. If we take into account the mineral matter (ash) which

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terms of heat. The heat required to raise 1 gramme (= 15·5 grains) of water through 1 degree Centigrade (= $1\frac{4}{5}$° Fah.) is taken as the unit of energy, and is known as a (small) *calorie.* The energy that can be produced by the complete combustion (digestion) of 1 gramme of any kind of foodstuff may then be set down in Calories; and this has been done for the different cereal foods described in this bulletin. Just as the combustion of a ton of coal in an engine may produce more energy than the combustion of an equal weight of wood, so the digestion of a gramme of fat produces, in the human body, a greater amount of energy than the digestion of a gramme of sugar or starch or white of egg or lean beef. Expressed in calories, the energy producing power of common foods is as follows:—

1 gramme of the dry substance—

| | | |
|---|---|---|
| Fat (average for various fats) | 9·3 | calories. |
| Proteids ( " " proteids) | 5·71 | " |
| Carbohydrates (average) | 4·1 | " |

Of course, any failure to burn the coal completely to ashes in the engine will result in a reduction of the energy derivable from a given weight of it; and just so, the failure to completely digest any part of our food means a reduction of the energy which we might derive from it. Now the possibility of completely burning the fuel in an engine depends partly on the nature of the fuel itself, and partly on the peculiarities of the engine. In a similar way the possibility of completely digesting our food depends partly on the character of the food and the way it is cooked, or otherwise prepared; and partly upon the personal idiosyncrasy of the man himself. Whatever escapes digestion is not only useless, but in most cases harmful, since it consumes energy in the effort to ingest it and to egest it; just as stones in coal cause not merely a negative harm, but a positive loss since they take up heat which would otherwise go to making steam.

It may be accepted as true that, under favourable conditions, fats (*e.g.* butter, beef and mutton fat, lard, cotton seed, olive and other oils, &c) and carbohydrates (*e.g.* starch, sugars, dextrin, &c.) can be completely burnt (digested) in the body, and therefore the number of calories quoted per gramme, represents an amount of energy that can really be obtained from them, whether burnt outside of the body, or digested within it. In the case of proteids (*e.g.* lean meat, egg, casein of cheese and milk, gluten of flour, &c.) on the contrary, the digestion within the body is never so perfect as to secure all the energy that would be derived from perfect combustion of these substances outside of the body. Careful experiments have shown that whereas 5·71 calories measures the energy per gramme of proteids fully oxidized outside of the body, the energy obtained from their digestion within the body varies from 3·8 to 4·4 calories.

This is because of the peculiar character of proteids in relation to nutrition, and requires explanation.

We need more than energy to keep any machine going. The parts of the machine wear out, and the further supply of energy producing substance (fuel) to drive it, can only result in destroying the mechanism. It must go to the repair shop. The human body has its own repair shop within itself, and it is from the proteid matters of our food that repairs to the body tissues are made. The blood is the circulating fluid by which this structural material is carried to the parts where it is wanted, and by which also, the debris, or worn out tissue, is got rid of. The special organs which eliminate this waste tissue are the lungs, the kidneys, the skin and the bowels; while the organs which immediately supply new tissue—forming material to the blood are the lacteals (of the is no less necessary to complete nutrition, we find marked differences among these foods. If one were to live entirely or principally upon these foods, it would be very necessary to take account of this. Finally, on account of its very high energy factor, we may lay stress upon the content of fat; and here also oatmeal stands in the first place.

On the whole, I am of opinion that as a well balanced material for porridge, these analytical results justify me in claiming a very high, if not the highest place for oatmeal, and especially in the form of rolled oats.

Recognizing, however, as I do, that our knowledge of the intimate character of the components of cereals, and of their relative digestibility, is yet far from complete, it would be presumption in me to pronounce judgment in an unqualified way, in this matter.

In an appendix to this report I have put on record a considerable amount of work, which must be regarded as a contribution towards the development of a fuller knowledge of this highly important subject.

I have the honour, to be, Sir,
Your obedient servant,
A. McGILL,
*Assistant to the Chief Analyst.*

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small intestine) and the lymphatic duct. The worn out proteid material is largely got rid of as urea, uric acid and other substances, which still contain latent energy, thus accounting for the apparent loss of energy occurring in the digestion of proteid foods.

Cereals, as the analytical numbers in the tables prove, contain all the substances necessary for nutrition, i.e. proteids, fat and carbohydrates; but these are contained very disproportionately. (It must not be forgotten that mineral matter is needed in a complete food; this also is found in cereals.) Whole wheat may be taken as having the following average composition:—

| | |
|---|---|
| Proteids | 12·3 |
| Fat | 1·7 |
| Carbohydrates | 67·6 |
| Mineral matter | 1·8 |
| Water | 14·0 |
| Cellulose | 2·6 |

Cellulose we must count as waste in food. It is the substance of which wood consists and contains much energy, but the human organism is not able to make use of this energy, in other words, cellulose is indigestible. May it not be that proteids and carbohydrates and even fat exist, which like cellulose, contain energy that the human system cannot utilize? The answer is undoubtedly, yes! And even among proteids, &c., that are digestible, and hence available for food, degrees of digestibility exist. The value of a food stuff is therefore not dependent merely upon its content of proteid or carbohydrate or fatty matter, but also upon the digestibility of such matter. Pea flour contains fully double the proteid matter of wheat flour, but is not on that account twice as valuable for human food. Almonds and other nuts contain still more proteid matter, but we should soon find our digestion seriously disturbed if we tried to live on almonds. Whoever shall discover a method of preparing nuts, beans and peas, so as to render them easily digestible will confer a great boon on humanity. There are similar differences in the digestibility of carbohydrates. Cellulose (woody fiber) and sugar are both carbohydrates; but while the latter is a valuable food, the former has no value. Starch is a carbohydrate, and raw starch can be slowly and with difficulty it is true, digested. Its value is immensely increased by cooking. The various processes of cooking starch have all for their object, the increase of its digestibility; and this is effected by converting it, more or less completely, into the substances known as *soluble starch, dextrin, maltose, dextrose*, &c. No doubt these substances have a varying value for the human animal, among themselves; but further study of this interesting subject must be left to those who care to give time to it. I may mention Mandels' translation of Hammarsten's Physiological Chemistry (John Wiley & Sons, New York, 1900) as a reliable and very readable presentation of the subject. A. McG.

## APPENDIX TO BULLETIN ON CEREAL FOODS.

At the meeting of the American Association of Official Agricultural Chemists, held at Washington in 1900, it was decided to make a systematic effort to outline methods for the examination of foods. The subject, cereal products, was allotted to me; but I was not able, during the following year, to prepare any work worthy of presentation to the association. During the last six months I have taken advantage of the opportunity offered me by the collection of breakfast foods, and their submission to me for analysis, to carry on some research work in connection with this subject; and I presented a provisional report upon the subject of cereal analysis to the Washington meeting this year, although I was not privileged to be personally present at the discussion. This provisional report was based upon the work given in the appendix following; and although far from exhausting the subject with which it deals, I trust that it may do something towards aiding food analysts in this difficult and exceedingly important department of our work.

A. McGILL.

December 10, 1902.

### PREPARATION OF THE SAMPLES.

In the work described in the sequel, finely ground samples (flours) were not further prepared than by thorough mixing. Samples, like most of the breakfast foods, which occur in granules or in flakes, were passed through a mill several times, until about 75 per cent of the material was fine enough to pass through a sieve of 1 mm. mesh, while the whole passed through a 2 mm. sieve. The following numbers illustrate the degree of fineness obtained:—

| | 2 mm. sieve. p.c. | 1 mm. sieve. p.c. | 0·5 mm. sieve. p.c. |
|---|---|---|---|
| A sample of 'Grape nuts' | 100 | 72 | 18 |
| " 'Life chips' | 100 | 74 | 21 |
| " 'Malta Vita' | 100 | 71 | 25 |

### DETERMINATION OF MOISTURE IN CEREALS.

Two methods of working are evidently available, viz.:—

1. By loss of weight on exposure of the sample to a dessicating atmosphere.

2. By absorption of moisture in some hygroscopic substance contained in a weighed tube.

The last may be called the 'positive method.' It has the disadvantage of requiring more time and labour in its execution, since each sample must be operated on independently. It has the merit of enabling the volatile matters which escape on heating the sample to be separated by using absorbents of special character. This method has not been examined, but will be investigated as leisure permits.

The results obtained by the 'method of loss' have been studied. The loss of weight is not necessarily water only. Gaseous products, other than vapour of water, may come off under the influence of heat. These may include carbon dioxide and hydrocarbons, especially if the temperature is allowed to rise much above 100°. It would be better to describe the result of this treatment as 'Loss of weight on drying'; or volatile matter lost at the temperature of the experiment.

QUERY 1.—Do cereals continue to lose weight by prolonged exposure to hot air?

A sample of Strong Bakers' flour was exposed at 95° C. to a current of air—used from 1 to 2 grammes.

Loss of weight.

| | | After 7 hours. | After 22 hours. |
|---|---|---|---|
| Flour | (a) | 13·27 | 12·47 per cent. |
| | (b) | 13·10 | 12·60 „ |
| | (c) | 13·10 | 12·55 „ |
| | (d) | 12·90 | 12·40 „ |
| Mean | | 13·09 | 12·50 „ |

*Inference.*—When flour is heated for many hours in air at 95° C. a point is reached beyond which it begins to increase in weight.

On exposing this sample at 105° in an atmosphere of dry coal gas for three hours, the loss of weight was—(a) 13·7; (b) 13·9; mean=13·8 per cent.

Query 2.—Would a lower temperature than 95° serve the purpose of drying in air?

The same sample (Strong Bakers' flour), together with samples of 'pastry flour,' 'corn starch' and 'Force'—a prepared cereal food—were submitted to a current of air at 70° C.—(2·5 grammes on watch glasses):—

*Time = 15 hours.*

| | | | |
|---|---|---|---|
| Strong Bakers' flour | (a) | 11·04 | =11·06 per cent. |
| | (b) | 11·08 | |
| Pastry flour | (a) | 12·48 | =12·68 „ |
| | (b) | 12·88 | |
| Corn starch | (a) | 10·48 | =10·62 „ |
| | (b) | 10·76 | |
| Force | (a) | 10·28 | =10·48 „ |
| | (b) | 10·68 | |

On further subjecting these samples to a temperature of 105°, in air, the loss of weight was as follows:—

| | | | |
|---|---|---|---|
| Strong Bakers' flour | (a) | 13·76 | =13·52 per cent. |
| | (b) | 13·28 | |
| Pastry flour | (a) | 14·32 | =14·30 „ |
| | (b) | 14·28 | |
| Corn starch | (a) | 12·36 | =12·24 „ |
| | (b) | 12·12 | |
| Force | (a) | 11·36 | =11·50 „ |
| | (b) | 11·64 | |

*Inference.*—An exposure of 15 hours in air at 70° C. does not thoroughly dry cereals.

Query 3.—Would it be possible to obtain the maximum *loss of weight* by weighing at intervals and noting the time at which the samples ceased to lose weight?

The above samples were exposed on watch glasses in a current of air at 105° and weighed at intervals of *one hour* until maximum loss of weight was obtained.

| | | | |
|---|---|---|---|
| Strong Bakers' flour | (a) | 13·68 | = 13·72 per cent. |
| | (b) | 13·76 | |
| Pastry flour | (a) | 14·24 | = 14·22 „ |
| | (b) | 14·20 | |
| Corn starch | (a) | 12·16 | = 12·26 „ |
| | (b) | 12·36 | |
| Force | (a) | 12·12 | = 12.06 „ |
| | (b) | 12·00 | |

Unfortunately, the only one of these samples which was dried in coal gas, is the first. It gave 13·8 per cent loss, under these conditions.

*Inference.*—It is probable that a very close approximation to accuracy would result from weighing at fixed intervals of one hour, and accepting maximum loss of weight at 105°, in air, as the datum wanted.

For the following study, which is in the main corroborative of the foregoing, six samples of cereal foods were chosen.

Quantities of 2·5 grammes, on watch glasses, were exposed at 100° C., to an atmosphere of dry coal gas.

| — | Loss of Weight. | | | | | |
|---|---|---|---|---|---|---|
| | At 100°. | | | | | At 110° |
| | 2 hours. | 4 hours. | 8 hours. | 10 hours. | 16 hours. | 4 hours. |
| Malt breakfast food, No. 17850. ...... | 9·28 | 9·80 | 10·12 | 10·24 | 10·48 | 10·52 |
| Rolled oats, No. 23333*(b)*. .... .... . | 10·52 | .......... | 10·80 | 10·92 | 11·08 | 11·08 |
| Ralston breakfast food, No. 20230. ... | 11·64 | 12·08 | 12·24 | 12·40 | 12·60 | 12·60 |
| Force (special sample) ... . ...... .... | 13·68 | 14·12 | 14·28 | 14·40 | 14·56 | 14·56 |
| Malt breakfast food, No. 20225*(b)*..... | 9·20 | 9·76 | 10·04 | 10·16 | 10·32 | 10·36 |
| Grape nuts, No. 22034*(b)*.. ... ... ... | 7·56 | 8·16 | 8·52 | 8·68 | 8·88 | 9·00 |

The figures in the last column give the loss of weight from raising the temperature to 110°., for 4 hours longer; and indicate that drying is complete at 100° C. in 16 hours. The full time of 16 hours appears to be necessary at this temperature. An error of nearly one-fourth of one per cent would result from taking the weight after 10 hours, as final.

Other portions of 2·5 grammes of these same samples were used in the following work. Exposure at 95°–96° in a current of air, for varying periods, gave these results:

| — | | Loss of Weight. | | | | Maximum Loss of Weight. | Loss in Coal Gas at 100°. |
|---|---|---|---|---|---|---|---|
| | | 1 hour. | 2 hours. | 19 hours. | 21 hours. | | |
| Malt breakfast food (17850)........ | (a) | 9·20 | 9·60 | 10·00 | ....... ... | 10·00 | 10·52 |
| | (b) | 5·80 | 9·40 | 9·88 | . . . . .... | | |
| Rolled oats (23333*b*). ............. | (a) | 10·24 | 10·48 | 10·56 | ... .... | 10·56 | 11·08 |
| | (b) | 10·48 | 10·52 | 10·44 | .. ....... | | |
| Ralston breakfast food (20230).. .. | (a) | 11·16 | 11·44 | 12·12 | . ..... | 12·24 | 12·60 |
| | (b) | 11·28 | 11·64 | 12·24 | .... .... | | |
| Force (special)........... ... .... | (a) | 13·24 | .......... | 14·24 | .......... | 14·24 | 14·56 |
| | (b) | 13·44 | 13·72 | 13·72 | 13·84 | | |
| Malt breakfast food (20225*b*)... ... | (a) | 8·96 | 9·88 | 9·88 | ...... .... | 9·88 | 10·36 |
| | (b) | 9·48 | 9·64 | 9·76 | 9·76 | | |
| Grape nuts (22034)................ | (a) | 7·04 | ... .... | 8·36 | .......... | 8·56 | 9·00 |
| | (b) | 7·72 | 8·08 | 8·20 | 8·56 | | |

*Inference.*—From these results one is compelled to conclude that even 21 hours at 96° does not fully dry cereals, or that the point of drying has been passed before the expiration of this time, and increase of weight (by oxidation) has begun to take place. This is consistent with experimental work already recorded.

The following work further illustrates the fact that attempts to dry cereals in air, at 98° to 100°, fail to drive off all the volatile matter, or permit of oxidation to such an extent as to show less than the true percentage of volatile matter, when this is calculated from apparent loss of weight:—

| 'Malt Breakfast Foods.' | Coal Gas at 105 for 3 hours. | Air at 98° for 20 hours. | Difference |
|---|---|---|---|
| No. 4,309 | 10·56 | 9·70 | 0·86 |
| " 17,850 | 9·67 | 8·95 | 0·72 |
| " 21,232 | 8·09 | 7·45 | 0·64 |
| " 22,040 | 9·59 | 9·15 | 0·44 |
| 'Force.' | | | |
| No. 4,308 | 11·40 | 8·94 | 2·46 |
| " 17,427 | 10·65 | 9·85 | 0·80 |
| " 17,851 | 11·25 | 8·95 | 2·30 |

*Query 4.*—What is the amount of unavoidable experimental error in the method of drying in coal gas?

Duplicates already quoted show that the differences obtained in these may be very large when the drying is done in air. The following duplicates were worked as nearly as possible under like conditions, in dry coal gas:—

DUPLICATES: *loss in 2·5 hours at 110°.*

| 'Malt Breakfast Food.' | | Difference. |
|---|---|---|
| No. 4,309 | 11·00 and 10·56 | 0·44 |
| " 17,850 | 10·10 " 9·67 | 0·43 |
| " 21,232 | 8·80 " 9·20 | 0·40 |
| " 22,040 | 10·40 " 9·59 | 0·81 |
| 'Force.' | | |
| No. 21,226 | 12·50 and 12·90 | 0·40 |

*Inference.*—An error of about 0·5 per cent is unavoidable, and the method must not be held to any closer interpretation.

Hence determination of fat by any method involving determination of moisture must be altogether untrustworthy.

*Fat.—(Petroleum Ether Extractive) by methods that involve the estimation of moisture.*

It is apparent that the following results have no value, except as illustrating the impossibility of accurately determining fat by indirect methods.

Five grammes was interstratified with fibrous asbestos in Macfarlane tubes, and extracted, in Soxhlet tubes, for eight hours. In most cases the solvent was applied without previous drying of the sample. The final drying was made at 105°–110° C. in air.

| Sample. | Total loss to Petroleum Ether and Dry Air. | | | Moisture lost at 105°–110°. | Difference (Fat). | Fat (Ether Extract) obtained by direct Weighing. |
|---|---|---|---|---|---|---|
| | (a.) | (b.) | Mean. | | | |
| | | | | | p. c. | |
| ‘Malt Breakfast Food’— | | | | | | |
| 4,309 | 10·96 | 11·28 | 11·12 | 10·78 | 0·34 | ........... |
| 17,850 | 9·88 | 10·20 | 10·04 | 9·89 | 0·15 | ........... |
| 21,232 | 9·12 | ........ | 9·12 | 9·00 | 0·12 | ........... |
| 22,040 | 10·76 | ........ | 10·76 | 9·99 | 0·77 | 1·15 |
| 23,330 | 9·48 | ........ | 9·48 | 9·20 | 0·28 | ........... |
| ‘Force’— | | | | | | |
| 4,308 | 11·52 | ........ | 11·52 | 11·40 | 0·12 | ........... |
| 17,427 | 10·72 | ........ | 10·72 | 10·65 | 0·07 | ........... |
| 17,851 | 12·36 | ........ | 12·36 | 11·25 | 1·11 | 1·26 |
| ‘Malta Vita’— | | | | | | |
| 17,426 | 12·00 | ........ | 12·00 | 11·15 | 0·85 | 1·23 |
| ‘Grape Nuts’— | | | | | | |
| 22,034 | 9·96 | 10·24 | 10·10 | 9·50 | 0·60 | 0·61 |
| ‘Life Chips’— | | | | | | |
| Special | 11·24 | ........ | 11·24 | 9·90 | 1·34 | 1·69 |
| ‘Ralston Breakfast Food’— | | | | | | |
| 20,230 | 13·20 | 13·20 | 13·20 | 12·50 | 0·70 | 1·42 |
| 21,684 | 15·12 | ........ | 15·12 | 13·64 | 1·48 | 1·65 |

The indirect method is untrustworthy inasmuch as (1) the difference between duplicate tests is often greater than the total amount of fat; (2) the preceding study of moisture determination shows an experimental error of about 0·5 per cent, which error would invalidate any results obtained for fat, in which the moisture per centage had to be deducted.

The following mode of operating has been found satisfactory:—Quantities of the material varying from 2·5 to 5 grammes are wrapped in fat-free filter paper and tied with ordinary sewing cotton. The cartridges so formed are dried in coal-gas, at 105°; and extracted in a Soxhlet tube with mixed pretroleum and ethyl ethers; or with petroleum ether only. The ether must be rectified, and found to leave no residue on evaporation. The extractive is evaporated to dryness in tared glass capsules, and weighed. If desired, the fat so recovered may be examined as to its refractive index, and its behaviour with reagents. The quantity obtained is, however usually too small to permit of detailed examination; and if the ordinary physical constants are to be determined, it is necessary to make a special extraction of a larger quantity of material.

The numbers given in the last column of the preceding table, were obtained by operating in this way.

It was noted that the fat recovered from the cereal foods examined did not gain weight on continued exposure to air at 100° C. for 15 hours.

## ASH.

It is usually recommended to carry out the operation of ‘ashing’ in a muffle, maintained at a low red heat. This method is tedious in the case of cereals, which burn very slowly. It is advantageous to treat the partly burnt material with water, filter, and complete the incineration of the residue, (with the filter) finally adding to it the solids obtained by evaporating the filtrate to dryness.

*Hebebrand* (Zeit. für Untersuch, der Nahr. and Genussmcttel, 1902, 719—through Analyst, 1902, 342) recommends a platinum dish having circular holes just below its edge. This is covered by a lid and chimney made of aluminium ; and it is claimed that incineration is complete in about half the usual time with this apparatus.

The following determinations have been made in platinum dishes, over a Bunsen burner. The heat is kept low at first, but finally raised to distinct redness.

With samples of *Malt Breakfast Food*, the following percentages of ash were obtained :—0·58, 0·58, 0·54, 0·56, 0·52, 0·56, 0·56, 0·39, 0·47, 0·66, 0·60, 0·60 ; mean value, 0·56 per cent.

With samples of 'Force' :—2·92, 2·76, 2·72, 2·60 : mean value, 2·75 per cent.

With samples of Life Chips :—2·82, 2·38 ; mean value, 2·60 per cent.

With samples of Ralston Breakfast Food :—0·70, 0·86 ; mean value, 0·78 per cent.

Grape nuts, gave 1·64 per cent.

Rolled oats, gave 1·68 per cent.

### CRUDE FIBRE.

This datum is necessarily of an indefinite character. In the following illustrative table, the work recorded was done after the method recommended by the association of American Agricultural Chemists. A variation in manipulation, by the introduction of a large centrifuge (see description of centrifuge at end of bulletin) somewhat facilitated the filtration. After the acid treatment, two to three volumes of alcohol are added, and the liquid whirled for twenty minutes or so. The addition of alcohol is necessary, because the separated fibre is of nearly the same specific gravity as the menstruum. After alkali treatment, direct filtration has been found most satisfactory : the centrifuge being here of no advantage.

| 'Malt Breakfast Food' — | Crude Fibre, p. c.— | |
|---|---|---|
| No. 4309 | 0·94 : 0·90 | Mean value=1·05 |
| 17850 | 1·08 | |
| 20225 | 1·24 | |
| 21232 | 0·96 | |
| 21685 | 1·00 | |
| 22040 | 1·44 : 1·08 | |
| 23330 | 0·80 : 1·06 | |
| 'Malta Vita'— | | |
| No. 17426 | 2·50 : 2·30 | Mean value=3·15 |
| 21225 | 3·90 | |
| 'Grape Nuts'— | | |
| No. 22034 | 2·6 : 1·46 | Mean=2·03 |
| 'Life Chips'— | | |
| Special | 2·90 | |
| 'Ralston Breakfast Food'— | | |
| No. 21684 | 1·64 : 1·72 | Mean =1·68 |
| 'Force'— | | |
| No. 17851 *(b)* | 2·60 | |
| 'Rolled Oats'— | | |
| No. 23333 *(a)* | 3·14 | |

### NITROGEN.

The total nitrogen has been worked on 1 gramme of material, by the Gunning-Kjeldahl method.

The soluble nitrogen has been obtained by evaporating to dryness, in a Kjeldahl-digestion flask, 75 cc of a 10 per cent aqueous solution and treating the residue as above.

Evaporation is conveniently effected by aspirating a current of air through the flask, while this is on the water bath.

In a few cases this estimation has been made on a 5 per cent solution, and in every instance the dissolved nitrogen so obtained was notably higher. This would seem to point to the difficult solubility of the forms in which nitrogen is present in these substances.

| — | Nitrogen—Per Cent. | | |
|---|---|---|---|
| | Total. | Soluble. | |
| | | Ten p.c. Soln. | Five p.c. Soln. |
| 'Malt Breakfast Food'— | | | |
| No. 4309 | 2·12 | 0·31 | .... |
| 17850 | 1·965 | 0·14 | 0·21 |
| 20225 (*a*) | 1·96 | 0·15 | 0·25 |
| 20225 (*b*) | 1·98 | 0·14 | .... |
| 21232 | 1·82 | 0·17 | 0·28 |
| 21685 | 2·21 | 0·19 | .... |
| 22040 | 1·92 | 0·155 | 0·241 |
| 23330 | 1·96 | 0·16 | |
| Mean value | 1·99 | 0·18 | |
| 'Force'— | | | |
| No. 4308 | 1·90 | 0·23 | |
| 17427 | 1·76 | 0·26 | |
| 17851 (*a*) | ... | 0·23 | |
| 17851 (*b*) | ... | 0·17 | |
| 21226 | 1·95 | 0·19 | |
| Special | 1·79 | 0.15 | |
| Mean value | 1·85 | 0·21 | |
| 'Malta Vita'— | | | |
| No. 17426 | 1·52 | 0·16 | |
| 21225 | 1·63 | 0·25 | |
| Mean value | 1·58 | 0·21 | |
| 'Grape Nuts'— | | | |
| No. 22034 (*a*) | 1·90 | 0·30 | |
| 22034 (*b*) | 1·93 | 0·30 | |
| Mean value | 1·92 | 0·30 | |
| 'Life Chips'— | | | |
| No. 21230 | 1·51 | 0·25 | |
| Special | 1·59 | 0·19 | |
| Mean value | 1·55 | 0·22 | |
| 'Ralston Breakfast Food'— | | | |
| No. 20230 | 2·29 | 0·26 | |
| 21684 | 1·70 | 0·25 | |
| Mean value | 2·00 | 0·26 | |
| 'Rolled Oats'— | | | |
| No. 23333 (*a*) | 2·10 | 0·12 | |
| 23333 (*b*) | 1·96 | 0·13 | |
| Mean value | 2·03 | 0·13 | |
| Granulated oatmeal | 2·08 | 0·18 | |
| Peameal | 4·41 | 1·19 | |
| Cornmeal, ordinary | 1·64 | 0.26 | |
| " golden | 1·43 | 0·07 | |

That differences in the nutritive value of the azotized components of cereals exist is a generally accepted fact. The proteids are doubtless of more importance as food material than the amidic substances, which are possibly intermediate products of their metabolism.

It is now equally certain that the proteids themselves vary in nutritive value. The following quotation is from the Monatsh. für Chemie, 1901, 991—through the Jour. Soc. Chem. Indust., 1902, p. 132:—

'A. Jolles has previously shown that there are essential differences in the proteids, and that, according to their constitution, a certain portion of the nitrogen is converted into urea on oxidation. Parallel experiments on man show that casein (which gives 73 per cent of its nitrogen as urea on oxidation) left 16·7 per cent of its nitrogen unabsorbed, while fibrin (which gives 45 per cent of its nitrogen as urea on oxidation) left 34·3 per cent of its nitrogen unabsorbed under similar conditions. Thus the physiologically nutritive value of the proteins in regard to nitrogen depends on the amount of the urea forming groups.'

It is quite probable that similar differences exist among the proteids of cereals; and possibly among the different proteids of the same cereal there may be found characteristic properties which shall justify efforts to cumulate one or another species of proteid for special food purposes.

I have placed the soluble nitrogen (amide nitrogen ?) on record without any attempt to interpret it.

### COLD WATER EXTRACTIVE.

This has been prepared by treating 30 grammes of the sample with 280 cc. distilled water. The resulting solution is nominally of 10 per cent strength—on the assumption that the density of the sample is 1·5. This assumption seems justified by the fact that the mean density of wheat flour is 1·56.

The solution is made by shaking the sample with the solvent for a period of 18—20 hours (over night) on an apparatus which I have called a 'rotator.' This consists of a wooden disc, to which 4 Erlenmeyer's of about 350 cc. can be attached radially. The wheel is 15 inches in diameter, and its surface is cut out in such a way that the Erlenmeyer flask fits into a depression, where it is securely held by rubber bands secured to small brass hooks screwed into the wheel. The whole is driven by a small water-motor at the rate of 30—40 revolutions per minute.

The separation of the insoluble matter is facilitated by the use of a large centrifugal machine (see description at end) making about 1,500 revolutions per minute. After 20 minutes in this apparatus the decanted liquid easily passes through ordinary filter paper, about 200 cc. being obtained, as a rule.

Unless the centrifuge is used, a very long sedimentation is needed, and it is difficult to get a liquid which can be filtered. Probably it would be best to work with 5 per cent solutions when a centrifuge is not available.

On the solution so obtained (solution A) the following estimations are made:—

1. Density.
2. Total solids in solution.
3. Reaction with iodine.
4. Reducing substances (Fehling solution).
5. Dissolved nitrogen.
6. Dextrine (matters precipitated by alcohol).
7. Preparation of solution B.

Work on solution A—(i.e., 10 per cent. solution).

1. *Density* has been determined by the sp. gravity bottle at 15·5 C.

2. *Total solids*—20cc.—evaporated to constant weight at 100° C.—on asbestos fibre.

3. *Reaction with Iodine*—1 to 2 cc. is very much diluted with water, and a very dilute solution of iodine added. It is thus easy to avoid mistaking the brown colour due to erythro-dextrin. Where soluble starch as well as dextrin is present, the blue of the starch appears before the brown-red of dextrin.

Thus 'Force' gives *blue* and then *brown*.

'Grape Nuts' gives *brown*.

'Oatmeal' and some other foods give *no colour*.

4. *Reducing substances*—25cc (= 2 grammes) is made up to 50cc. with water, and heated to 100°C. This is poured into 50 cc. of Fehling's solution, also at 100°C., and the mixture kept at this temperature for ten minutes. The precipitated $Cu_2$ 0 is then rapidly filtered off, and washed on an asbestos filter, using the pump. It is finally washed with strong alcohol, dried and weighed. The $Cu._20 \times 50 = Cu._20$ per cent .as in the tables below.

5. *Dissolved nitrogen* has been already referred to. (See page 46.)

6. *Dextrin*—25 cc. (= 2 grammes) is concentrated to 10 cc., and any matters thrown out of solution by this operation are separated by filtration. To the filtrate (= 10 cc.) is added 100 cc. of alcohol (density = 0·810). The precipitate is collected on a tared filter, dried and weighed. Weight × 50 = dextrin per cent. The 'dextrin' so obtained cannot, of course, be regarded as pure. I have not had leisure to fully examine the character of the substances precipitated by alcohol; but shall investigate this matter at the first opportunity.

An examination of the tables will show that 2 to 3 per cent. of substances precipitated by alcohol is sometimes present when no iodine reaction for dextrin (erythrodextrin) occurs.

The following table gives a synopsis of the results of work, as indicated, on *Solution A* :—

Mean Results Obtained.

| Breakfast Foods. | Density of 10 p.c. solution. | Dry solids p.c. | Reaction with Iodine. | Reducing substances. As $Cu_2$ 0 p.c. | 'Dextrin.' |
|---|---|---|---|---|---|
| Malt Breakfast Food | 1·0051 | 13·00 | None to brown | 7·29 | 3·24 |
| Force | 1·0129 | 29·60 | Blue to brown | 7·00 | 14·48 |
| Malta Vita | 1·0127 | 30·88 | Blue to brown | 16·20 | 9·26 |
| Grape Nuts | 1·0199 | 49·50 | Brown | 23·80 | 24·87 |
| Life Chips | 1·0087 | 19·30 | .............. | 9·85 | 12·16 |
| Ralston Breakfast Food | 1·0035 | 7·50 | None | 0·0 | 2·62 |
| Rolled Oats | 1·0025 | 6·19 | None | 0·0 | 3·58 |
| Oatmeal | 1·0020 | ............ | None | 0·0 | |
| Peameal | 1·0076 | .......... | None | 0·0 | |
| Common Cornmeal | 1·0035 | ...... . . | None | 0·0 | |
| Golden Cornmeal | 1·0019 | ............ | None | 0·0 | |

The aqueous solution (solution A) is, of course, strongly dextro-rotatory, owing to its content of dextrin, soluble starch and other optically active substances having right hand rotation. The solution is, however, always more or less opalescent, and cannot be read in the polarimeter without clarification. I have found the following mode of clarifying both simple and efficient :—

80 cc. solution A (= 8 grammes material), is treated with 16 cc. of a 7 per cent alum solution, followed by 4 cc. of ammonia solution of such a strength as to precipitate all the alumina and leave a slight excess of ammonia. (The ammonia solution is about

1·85 normal strength.) On gently warming, the hydrate of alumina separates in flocks, and the liquid is easily filtered.

Filtrate = *Solution B.*

*Solution B*, is read at 20° C. in a 2 dm. tube. The reading (S–V–sugar scale units) is multiplied by $\frac{100}{8} = 12 \cdot 5$, to convert it to a percentage on the sample; i.e., to a concentration of 100 per cent. The rotation is thus expressed in the analytical tables.

Since, however, the optical activity is due to substances dissolved from the cereal, and not to the whole weight of the cereal, it is preferable to state the rotation as a *specific angular rotation* on the soluble solids.

This calculation is made by the formula,

$$S = \frac{a}{l \times \frac{c}{100}} = \frac{SV^{\circ} \times 0{\cdot}3468}{2 \times \frac{c \times p}{100}} = \frac{SV^{\circ} \times 0{\cdot}3468}{2\,p} = \frac{SV^{\circ} \times 0{\cdot}1734}{p}$$

or, $\text{Log } S = \text{Log } SV^{\circ} + \log \cdot 1734 - \log.\ P.$

where p = weight of soluble matter per 1 cc. of solution A, and 0·3468 is the A.O.A.C. factor for converting S V degrees into rotary degrees.

In the following table the rotatory power is stated in both ways, and the ratio of dextrin found to the total soluble matter is calculated.

OPTICAL (ROTATORY) VALUE OF SOLUBLE MATERIAL.

| Name of Cereal. | S.V. degrees per 100 grammes. | Percentage soluble matter. | Specific rotation of soluble matter. | 'Dextrin' precipitate by alcohol. | Ratio of Dextrin to soluble matter. | Iodine reaction of Solution A. |
|---|---|---|---|---|---|---|
| Malt Breakfast Food. | 54·7 | 13·0 | 73·0 | 3·24 | 24·9 | None to brown. |
| Force........ | 122·7 | 29·6 | 72·0 | 14·48 | 49·0 | Blue to brown. |
| Malta Vita......... | 194·0 | 30·88 | 109·0 | 9·26 | 30·0 | Blue to brown. |
| Grape Nuts. .... | 301·0 | 49·5 | 105·4 | 24·87 | 50·2 | Brown. |
| Life Chips ......... | 140·0 | 19·3 | 125·7 | 12·16 | 63·0 | |

The gyrodynat of *dextrin* is about 200°; that of *soluble starch* varies from 196° to 200°. Hence the reading given above cannot in any way serve to distinguish between these two substances. The ratio of the alcohol precipitate to the total soluble matter, and the reaction with iodine should, however, furnish a clue to the relative proportions of these substances. In order to secure further information on this point I prepared a third solution, as follows:—

*Solution C.*—50 cc. of the clarified solution B (= 4 grammes sample) is treated with 2 cc. strong HCl, and heated to 65° C. for 15 minutes. The cooled liquid is neutralized by ammonia, and alumina cream is added to make a volume of 75 cc. The filtrate (solution C) is read at 20° C., and the reading multiplied by $\frac{100}{6} = 16\frac{2}{3}$, to convert to S.V. degrees per 100 grammes.

Both *dextrin* and *soluble starch* are converted into dextrose by prolonged treatment with hydrochloric acid, the former more readily than the latter.* My object was to secure conditions which would more or less closely discriminate between these substances. The gyrodynat of dextrose (+ 53°) is so much lower than that of either dextrin or soluble starch that a very decided alteration of rotatory power should result from this treatment. The numbers obtained are given in the analytical tables; but are so unsatisfactory that it is evident the inversion has proceeded quite irregularly and indefinitely. This is another point in which further work is required. In nearly every case the reading on inversion is lower than the original reading; but the extent of its change bears no simple relation to any known differences in the character of the solutions.

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* An important paper on the hydrolysis of starch by acids, by Rolfe and Defren, was published in Journal Am. Ch. Soc., 1896—p. 869. The authors find that the law (discovered by Brown and Morris in 1885) governing the conversion of starch by diastase, is essentially true of the conversion by acids. Their results show that the copper reducing power of the solution in progress of inversion, bears a constant relation to the optical value, under the most varying conditions of acidity, dilution, time of digestion, kind of acid used and pressure. Their conclusions are (1) In any homogeneous, acid converted starch product, irrespective of the conditions of hydrolysis, the specific rotatory power always represents the same chemical composition. (2) But three simple carbohydrates, possible in molecular aggregates, exist in the solution of a starch product hydrolyzed by acids (leaving out traces of reversion products.)

*Starch.*—It has not been possible to make a direct estimation of unchanged starch in all the samples. This estimation has, however, been made in several samples of the following brands, viz.: Malt Breakfast Food; Force, Grape Nuts and Life Chips.

The insoluble matter from 5 grammes of the sample was boiled for three hours with dilute hydrochloric acid (after Sachsses method), cooled, neutralized and made up to 500 cc. Aliquot portions of this solution were treated with Fehling solution, and the precipitated cuprous oxide calculated into starch (= dextrose × 0·92). The following results were obtained:—

STARCH.

| | | |
|---|---|---|
| Malt Breakfast Food................ | 60·35<br>65·34 | = 62·85 per cent. |
| Force............................ | 36·30<br>37.20 | = 36·75 " |
| Grape Nuts ..... .................. | 32·03<br>32·98 | = 32·50 " |
| Life Chips.... ..................... | 40·84<br>45·37 | = 43·10 " |

A. McGILL

# ANALYSIS OF BREAKFAST FOODS

## MALT BREAK

| Date of Collection. | | Description of Sample by Food Inspector. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher. | Serial Number. | Designation Number. | Moisture. Loss of weight at 110 in coal gas. | Fat. Petroleum ether extractive. | Ash. |
|---|---|---|---|---|---|---|---|---|---|
| 1902. | | | | | | | p. c. | p. c. | p. c. |
| July | 31 | Breakfast Food... | Sanderson & Co., Charlottetown, P.E.I. | The Malted Cereal Co., Montreal. | 1 | 4309 | 11·00<br>10·56 | ...... | 0·58 |
| | | | | | | | 10·78 | | |
| " | 28 | Cereal Breakfast Food. | G. M. & A. A. Barker, St. John, N.B. | " .. | 2 | 17850 | 10·10<br>9·67 | ..... | 0·58<br>0·54 |
| | | | | | | | 9·89 | | 0·56 |
| Aug. | 6 | Malt Breakfast Food. | S. L. Crop, Kentville, N.S. | " .. | 3 | 20225*a* | 10·20<br>10·60 | | 0·56 |
| | | | | | | | 10·40 | | |
| " | 6 | " " .. | " " .. | " .. | 4 | 20225*b* | 9·74 | 1·10 | |
| July | 24 | " " . | Hovey & Son, Cobourg, Ont. | " .. | 5 | 21232 | 8·08<br>9·02 | .. | 0·52<br>0·56 |
| | | | | | | | 9·00 | | 0·54 |
| " | 30 | " " .. | F. Filion, Vancouver, B.C. | " .. | 6 | 21685 | 11·30<br>10·50 | 0·85 | 0·39<br>0·47 |
| | | | | | | | 10·90 | | 0·43 |
| " | 29 | " " .. | F. A. Hatfield, Calgary | " .. | 7 | 21703 | . | .. | ... |
| " | 23 | " " .. | C. W. Griffin, Wingham, Ont. | " .. | 8 | 22040 | 9·59<br>10·40 | 1·19<br>1·10 | 0·66<br>0·60 |
| | | | | | | | 10·00 | 1·15 | 0·63 |
| | 21 | " " .. | J. B. Orr, Lennoxville, P.Q. | " .. | 9 | 23330 | 9·20 | .... | 0·60 |
| | | | | | | Means.. | 9·99 | 1·03 | 0·56 |

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* Precipitate by alcohol, from water extract.

Proteids (calculated from mean total nitrogen × 6·25) = 12·44 per cent.
Mean calories per 1 gram = 4094·8.

## FAST FOOD.

| Crude Fiber. | Nitrogen. |  | Cold Water Extractive. |  |  |  |  |  |  |  | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Total. | Soluble. | Density of 10 p. c. solution. | Solids dry at 100 C. | Iodine reaction. | Dextrin.* | Substances reducing Fehling Solution. $Cu_2O$ per 100 grammes. Before inversion. | Substances reducing Fehling Solution. $Cu_2O$ per 100 grammes. After inversion. | Rotation in 2 dm. tube, per 100 grammes. Before inversion. | Rotation in 2 dm. tube, per 100 grammes. After inversion. |  |
| p. c. | p. c. | p. c. |  | p. c. |  |  | p. c. | p. c. |  |  |  |
| 0·94<br>0·90 | 2·12 | 0·31 | 1·0043 | 12·00 | ...... | 1·88 | 5·52 | 6·45 | −27·5 | +30·0 | Starch granules mostly entire; but little cellular tissue visible; starch apparently wheat and oats (?) possibly barley. |
| 0·92 |  |  |  |  |  |  |  |  |  |  |  |
| 1·08 | 1·97<br>1·96 | 0·14 | 1·0055 | 12·10 | None.. | 2·24 | 7·00 | 7·36 | −65·0 | −75·0 |  |
|  | 1·96 |  |  |  |  |  |  |  |  |  |  |
| 1·24 | 1·96 | 0·15 | 1·0047 |  | ...... | 3·44 | .... | .... | .... | .... |  |
| ... | 1·98 | 0·14<br>0·14 | 1·0058 | 14·10 | None.. | 3·44<br>3·24 | 7·90 | 8·85 | +68·8<br>+67·5 | ....<br>+60·0 |  |
|  |  | 0·14 |  |  |  | 3·34 |  |  | +68·2 | +60·0 |  |
| 0·96 | 1·82 | 0·17 | 1·0043 | .... | ...... | .... | .... | .... | .... | .... |  |
| 1·00 | 2·21<br>2·21 | 0·19 | 1·0056 | 13·30 | Brown | 4·00 | .... | .... | −62·5 | −70·0 |  |
|  | 2·21 |  |  |  |  |  |  |  |  |  |  |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | This sample did not come to hand. |
| 1·44<br>1·08 | 1·92 | 0·16<br>0·15 | 1·0046<br>1·0056 | 12·60<br>13·36 | ...... | 2·84 | 8·75 | .... | +37·5 | +40·0 |  |
| 1·26 |  | 0·155 | 1·0051 | 12·98 |  |  |  |  |  |  |  |
| 0·80<br>1·06 | 1·96 | 0·16 | 1·0056 | 13·50 | Brown | 4·95 | .... | ..... | −67·5 | −46·6 |  |
| 0·93 |  |  |  |  |  |  |  |  |  |  |  |
| 1·05 | 1·99 | 0·18 | 1·0051 | 13·00 |  | 3·24 | 7·29 | 7·55 | +54·7 | +53·6 | Direct estimation of starch (unchanged) gave 62·85 per cent. |

### 'FORCE'

| Date of Collection. | Description of Sample by Food Inspector. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher. | Serial Number. | Designation Number. | Moisture. Loss of weight at 110° in coal gas. | Fat. Petroleum ether extractive. | Ash. |
|---|---|---|---|---|---|---|---|---|
| 1902. | | | | | | p. c. | p. c. | p. c. |
| July 31 | Breakfast Food.... | Beer & Goff, Charlottetown, P.E.I. | Force Food Co., Buffalo, N.Y. | 10 | 4308 | 11·4 | ..... | 2·92 |
| Aug. 11 | Force .... ..... . | D. W. McLean, Winnipeg. | " .. | 11 | 17427 | 10·65 | ..... | 2·76 |
| July 28 | Cereal Breakfast Food. | Van Wart Bros., St. John, N.B. | " .. | 12 | 17851*a* | 11·25 | ..... | 2·72 |
| 28 | " .. | " .. | " .. | 13 | 17851*b* | 11·20<br>10·70<br>10·95 | 1·26 | .... |
| " 22 | Force............ | P. Bruneau, Montreal.. | " .. | 14 | 21226 | 12·5<br>12·9<br>12·7 | ...... | 2·60 |
| " 22 | " ....... ... | " .. | " .. | 15 | Special. | 14·54<br>14·59<br>14·56 | 1·26<br>1·30<br>1·28 | |
| | | | | | Means.. | 11·92 | 1·27 | 2·75 |

### MALTA

| Date of Collection. | Description of Sample by Food Inspector. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher. | Serial Number. | Designation Number. | Moisture. Loss of weight at 110° in coal gas. | Fat. Petroleum ether extractive. | Ash. |
|---|---|---|---|---|---|---|---|---|
| Aug. 11 | Malta Vita (concentrated malted food). | Hardy & Buchanan, Winnipeg, Man. | Battle Creek Pure Food Co. | 16 | 17426 | 11·5<br>10·8<br>11·1 | 1·23 | 2·90 |
| July 22 | " .. | P. Bruneau, Montreal.. | " .. | 17 | 21225 | 12·0<br>10·2<br>11·1 | 1·28 | 3·10 |
| | | | | | Means.. | 11·1 | 1·25 | 3·00 |

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* Precipitate by alcohol from water extract.

FOOD.

| Crude Fiber. | Nitrogen. Total. | Nitrogen. Soluble. | Cold Water Extractive. Density of 10 p. c. solution. | Solids dry at 100° C. | Iodine reaction. | Dextrin. | Substances reducing Fehling Solution. Cu₂O per 100 grammes. Before inversion. | After inversion. | Rotation in 2 dm. tube, per 100 grammes. Before inversion. | After inversion. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| p. c. | p. c. | p. c. | | p. c. | | | p. c. | p. c. | | | |
| .. ... | 1·88 | 0·21 | 1·0118 | 26·3 | Blue .. | 17·0 | 6·3 | ... | +217·5 | +100·0 | Starch granules, mostly broken, and much fibrous tissue. Apparently wheat starch. |
| | 1·93 | 0·25 | | | | | | | | | |
| | 1·90 | 0·23 | | | | | | | | | |
| ...... | 1·76 | 0·26 | ..... | 36·6 | " .. | ...... | 6·7 | .... | +112·5 | +106·6 | |
| . . | ...... | 0·23 | 1·0186 | 38·2 | Blue-brown. | 24·16 | 3·9 | ... | +256·7 | +173·3 | |
| | | 0·23 | | 40·1 | | | | | | | |
| | | 0·23 | | 39·0 | | | | | | | |
| 2·60 | ..... | 0·16 | 1·0084 | 8·9 | " . | 8·36 | 7·75 | 5·35 | +95·0 | +23·3 | |
| | | 0·18 | 1·0082 | 12·9 | | 8·32 | | 4·80 | +95·0 | +40·0 | |
| | | 0·17 | 1·0083 | 10·9 | | 8·34 | | 5·05 | +95·8 | +32·6 | |
| ..... | 2·04 | 0·19 | 1·0129 | 34·7 | " . | 10·72 | 10·55 | 9·85 | +177·0 | +130·0 | Proteids (from mean total nitrogen × 6·25) = 11·56 p.c. |
| | 1·86 | | | 35·1 | | 10·64 | | | | | |
| | 1·95 | | | 34·9 | | 10·68 | | | | | |
| ..... | 1·79 | 0·15 | .. | ...... | ...... | 12·8 | ..... | ..... | .... ... | ........ | Calorific value = 3845·1 calories per gram. |
| | | | | | | 11·6 | | | | | |
| | | | | | | 12·2 | | | | | |
| 2·60 | 1·85 | 0·21 | 1·0129 | 29·6 | .... . | 14·48 | 7·00 | 7·45 | +122·7 | +108·5 | Direct estimation of unchanged starch gave 36·75 p.c. |

VITA.

| Crude Fiber. | Nitrogen. Total. | Nitrogen. Soluble. | Density of 10 p. c. solution. | Solids dry at 100° C. | Iodine reaction. | Dextrin. | Cu₂O Before inversion. | Cu₂O After inversion. | Rotation Before inversion. | Rotation After inversion. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2·50 | 1·53 | 0·15 | 1·0126 | 28·75 | Blue-brown. | 9·32 | 10·4 | 10·4 | +137·5 | ........ | Wheat starch, much broken, with much fibrous tissue. |
| 2·30 | 1·51 | 0·17 | | | | | 18·3 | | | | |
| 2·40 | 1·52 | 0·16 | | | | | 14·3 | | | | |
| 3·90 | 1·63 | 0·25 | 1·0128 | 33·00 | Brown | 9·04 | 16·1 | 9·3 | +250·0 | +200·0 | Proteids (from mean total nitrogen × 6·25) = 9·88 p.c. |
| | | | | | | 9·36 | 20·4 | 13·6 | | | |
| | | | | | | 9·20 | 18·2 | 11·4 | | | |
| 3·15 | 1·58 | 0·21 | 1·0127 | 30·88 | ....... | 9·26 | 16·2 | 10·9 | +194·0 | +200·0 | Calorific value = 3840·3 calories per gram. |

GRAPE

| Date of Collection. | Description of Sample by Food Inspector. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher. | Serial Number. | Designation Number. | Moisture. Loss of weight at 110° in coal gas. | Fat. Petroleum ether extractive. | Ash. |
|---|---|---|---|---|---|---|---|---|
| 1902. | | | | | | p. c. | p. c. | p. c. |
| July 29 | Grape Nuts.... | J. T. Macdonald, Calgary. | Postum Cereal Co., Ltd., Battle Creek, Mich. | 18 | 21704 | ...... | .. .. | .... |
| " 21 | Cereal Breakfast.. | Edward Flaherty, Stratford. | " .. | 19 | 22034*a* | 9·5 | 0·55 | 1·64 |
| " 21 | " .. | " .. | " .. | 20 | 22034*b* | 9·4<br>9·3 | 0·61<br>0·62 | .... |
| | | | | | | 9·35 | 0·615 | |
| | | | | | Means. | 9·43 | 0·58 | 1·64 |

LIFE

| Date of Collection. | Description of Sample by Food Inspector. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher. | Serial Number. | Designation Number. | Moisture. Loss of weight at 110° in coal gas. | Fat. Petroleum ether extractive. | Ash. |
|---|---|---|---|---|---|---|---|---|
| " 24 | Life Chips........ | Wallbridge & Clark, Belleville, Ont. | Health Food Co., London, Ont. | 21 | 21230 | ..... | ... | 2·82 |
| " 24 | " .. | " .. | " .. | 22 | Special. | 9·9<br>9·9 | 1·69 | 2·38 |
| | | | | | | 9·9 | | |
| | | | | | Means. | 9·9 | 1·69 | 2·60 |

RALSTON BREAK

| Date of Collection. | Description of Sample by Food Inspector. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher. | Serial Number. | Designation Number. | Moisture. Loss of weight at 110° in coal gas. | Fat. Petroleum ether extractive. | Ash. |
|---|---|---|---|---|---|---|---|---|
| Aug. 7 | Ralston's Breakfast Food. | Shaw Bros., Windsor, N. S. | Robinson Danforth Milling Co., Purina Mills, St. Louis | 23 | 20230 | 12·50<br>12·14 | 1·42 | 0·70 |
| | | | | | | 12·32 | | |
| July 30 | Breakfast Food... | F. Filion, Vancouver, B. C. | Purina Mills, St. Louis. | 24 | 21684 | 13·64<br>13·80 | 1·65 | 0·86 |
| | | | | | | 13·72 | | |
| | | | | | | 13·02 | 1·54 | 0·78 |

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* Precipitate by alcohol from water extract.

NUTS.

| | Nitrogen. | | Cold water extractive. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Substances reducing Fehling Solution. $Cu_2O$ per 100 grammes. | | Rotation in 2dm. tube per 100 grammes. | | Remarks. |
| Crude Fibre. | Total. | Soluble. | Density of 10 p. c. Solution. | Solids dry at 100° C. | Iodine reaction. | Dextrine * | Before inversion. | After inversion. | Before inversion. | After inversion. | |
| p. c. | p. c. | p. c. | | p. c. | | | p. c. | p. c. | | | |
| ..... | . . | .... | .... | .... | ....... | .... | ..... | ...... | ........ | ........ | This sample did not come to hand. |
| 2·60 | 1·89 | 0·29 | 1·0202 | 50·6 | Brown | 24·92 | 26·4 | 18·1 | + 300·0 | ........ | Calorific power (mean) = 3968·9 calories per gramme. |
| | 1·91 | 0·31 | 1·0189 | | | | 25·4 | 17·4 | + 280·0 | | |
| | 1·90 | 0·30 | 1·0196 | | | | 25·9 | 17·8 | + 290·0 | | Wheat starch; granules much broken; fibrous tissues. |
| 1·46 | 1·93 | 0·29 | 1·0202 | 48·1 | " | 24·76 | 21·5 | 16·0 | + 275·0 | + 240·0 | Proteids (mean total nitrogen × 6·25) = 12·00 per cent. |
| | | 0·30 | 1·0201 | 48·7 | | 24·88 | 21·7 | 15·5 | + 350·0 | + 300·0 | |
| | | 0·30 | 1·0202 | 48·4 | | 24·82 | 21·6 | 15·7 | + 312·0 | + 270·0 | |
| 2·03 | 1·92 | 0·30 | 1·0199 | 49·5 | | 24·87 | 23·8 | 16·8 | + 301·0 | + 270·0 | Direct estimation of unchanged starch gave 32·50 per cent. |

CHIPS.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ..... | 1·51 | 0·25 | ... | 19·3 | ....... | ... .. | 9·85 | 8·50 | + 140·0 | + 106·6 | Calorific value (mean) = 3925·9 calories per gramme. |
| 2·90 | 1·59 | 0·19 | 1·0091 | ... | ....... | 12·16 | ...... | ..... | ........ | ........ | Broken starch granules. Much husk tissue. |
| | | | 1·0084 | | | | | | | | |
| | | | 1·0087 | | | | | | | | Proteids (mean total nitrogen × 6·25) = 9·69 per cent. |
| 2·90 | 1·55 | 0·22 | 1·0087 | 19·3 | ....... | 12·16 | 9·85 | 8·50 | + 140·0 | + 106·6 | Direct estimation of unchanged starch gave 43·10 per cent. |

FAST FOOD.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ..... | 2·29 | 0·26 | 1·0038 | 7·0 | ....... | 3·32 | ...... | ...... | .. .. | ........ | Starch granules, mostly entire. Wheat and many small granules; rice. |
| 1·64 | 1·67 | 0·25 | 1·0031 | 8·0 | None. | 1·92 | 0·0 | 0·0 | 0 | 0 | Proteids (mean total nitrogen × 6·25) = 12·50 per cent. |
| 1·72 | 1·74 | | 1·0033 | | | | | | | | |
| 1·68 | 1·70 | | 1·0032 | | | | | | | | |
| 1·68 | 2·00 | 0·26 | 1·0035 | 7·5 | ...... | 2·62 | 0·0 | 0·0 | 0 | 0 | Calorific value = 3911·7 calories per gramme. |

## ROLLED

| Date of Collection. | Description of Sample. | Name and Address of Vendor. | Name and Address of Manufacturer or Furnisher. | Serial Number. | Designation Number. | Moisture. Loss of weight at 110 C. in coal gas. | Fat. Petroleum ether extractive. | Ash. |
|---|---|---|---|---|---|---|---|---|
| 1902. | | | | | | p. c. | p. c. | p. c. |
| July 22 | Rolled oats.. .. | J. E. B. Campeau, Stanstead, Que. | The Ogilvy Milling Co., Montreal. | 25 | 23333 (*a*) | 10·45 | ..... | 1·68 |
| " 22 | " ....... | " " .. | " " .. | 26 | 23333 (*b*) | 11·82<br>12·12 | 7·11<br>7·31 | .... |
| | | | | | | 11·97 | 7·21 | |
| | | | | | Means.. | 11·21 | 7·21 | 1·68 |
| " 22 | Rolled oats... ... | ........................ | ................... | 27 | Special. | 10·84 | 6·91 | 1·14 |
| " 22 | " ....... | ........................ | ................... | 28 | " | 10·40 | 1·33 | 2·62 |
| " 22 | " ... ... | ........................ | ................... | 29 | " | 13·12 | 5·21 | 1·42 |
| " 22 | " ........ | ........................ | ................... | 30 | " | 14·90 | 2·01 | 0·58 |

## TABULATION OF

| | | | | | |
|---|---|---|---|---|---|
| Malt Breakfast Food | .... | ........ | 9·99 | 1·03 | 0·56 |
| Force | .... | ........ | 11·92 | 1·27 | 2·75 |
| Malta Vita | .... | ....... | 11·10 | 1·25 | 3·00 |
| Grape Nuts | | ... .... | 9·43 | 0·58 | 1·64 |
| Life Chips | .. | ........ | 9·90 | 1·69 | 2·60 |
| Ralston Breakfast Food | .... | ........ | 13·02 | 1·54 | 0·78 |
| Rolled Oats | ... | ... .... | 11·21 | 7·21 | 1·68 |
| Oatmeal | .... | ........ | 10·84 | 6·91 | 1·14 |
| Peameal | ... | ........ | 10·40 | 1·33 | 2·62 |
| Common Cornmeal | .. | ....... | 13·12 | 5·21 | 1·42 |
| Golden Cornmeal | .... | ........ | 14·90 | 2·01 | 0·58 |

Calorific value per 1 gramme—
For Oatmeal.... 4270·6 calories.
Peameal.... 4132·7 "
Cornmeal (Common).... 4029·2 "
" (Golden).... 3804·3 "

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*Precipitate by alcohol from water extract.

OATS.

| Crude Fiber. | Nitrogen. | | Cold Water Extractive. | | | | | | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total. | Soluble. | Density of 10 p.c. solution. | Solids dry at 100° C. | Iodine reaction. | Dextrine.* | Substances reducing Fehling Solution $Cu_2O$ per 100 grms. | | Rotation in 2 dm. tube, per 100 grms. | | |
| | | | | | | | Before inversion. | After inversion. | Before inversion. | After inversion. | |
| p. c. | p. c. | p. c. | | p. c. | | p. c. | p. c. | p. c. | | | |
| 3·14 | 2·10 | 0·11 | 1·0024 | 6·0 | None. | 3·52 | 0 | 0 | 0° | 0 | Oat starch and fibre. |
| | | 0·13 | 1·0023 | | | 2·48 | | | | | |
| | | 0·12 | 1·0024 | | | 3·00 | | | | | |
| .... | 1·96 | 0·16 | 1·0027 | 6·95 | None. | 3·44 | 0 | 0 | 0 | 0 | *Proteids* (mean total nitrogen × 6·25) = 12·69 per cent calorific value = 4242·2 calories per gramme. |
| | | 0·09 | 1·0023 | 5·80 | | 4·88 | | | | | |
| | | 0·13 | 1·0025 | 6·38 | | 4·16 | | | | | |
| 3·14 | 2·03 | 0·13 | 1·0025 | 6·19 | ...... | 3·58 | 0 | 0 | 0° | 0° | |
| .... | 2·08 | 0·18 | 1·0020 | ...... | None. | ..... | 0 | 0 | 0° | 0 | Granulated oatmeal. |
| .... | 4·41 | 1·19 | 1·0076 | . . | " | . . . | 0 | 0 | +2·5° | 0° | Peameal. |
| .... | 1·64 | 0·26 | 1·0035 | ..... | " | .. | 0 | 0 | 0 | 0 | Common cornmeal. |
| .. | 1·43 | 0·07 | 1·0019 | ..... | " | ...... | 0 | 0 | ....... | 0 | Golden cornmeal. |

MEAN RESULTS.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1·05 | 1·99 | 0·18 | 1·0051 | 13·00 | None to brown. | 3·24 | 7·29 | 7·55 | + 54·7 | + 53·6 | Malt Breakfast Food. |
| 2·60 | 1·85 | 0·21 | 1·0129 | 29·60 | Blue or brown. | 14·48 | 7·00 | 7·45 | 122·7 | 108·5 | Force. |
| 3·15 | 1·58 | 0·21 | 1·0127 | 30·88 | Blue or brown. | 9·26 | 16·20 | 10·90 | 194·0° | 200·0 | Malta Vita. |
| 2·03 | 1·92 | 0·30 | 1·0199 | 49·50 | Brown. | 24·87 | 23·80 | 16·80 | 301·0 | 270·0 | Grape Nuts. |
| 2·90 | 1·55 | 0·22 | 1·0087 | 19·30 | Blue. | 12·16 | 9·85 | 8·50 | 140·0 | 106·6 | Life Chips. |
| 1·68 | 2·00 | 0·26 | 1·0035 | 7·50 | None. | 2·62 | 0·0 | 0·0 | 0 | 0 | Ralston Breakfast Food. |
| 3·14 | 2·03 | 0·13 | 1·0025 | 6·19 | " | 3·58 | 0·0 | 0·0 | 0 | 0 | Rolled Oats. |
| 4·28 | 2·08 | 0·18 | 1·0020 | 3·85 | " | .... | 0·0 | 0·0 | 0 | 0 | Oatmeal. |
| 1·36 | 4·41 | 1·19 | 1·0076 | 17·75 | " | .... | 0·0 | 0·0 | 2·5 | 0 | Peameal. |
| 3·50 | 1·64 | 0·26 | 1·0035 | 6·30 | " | .... | 0·0 | 0·0 | 0·0 | 0 | Common Cornmeal |
| 1·18 | 1·43 | 0·07 | 1·0019 | 2·90 | " | ..... | 0·0 | 0·0 | ........ | 0 | Golden Cornmeal. |

Proteids (total nitrogen × 6·25)—
For Oatmeal = 13·00 per cent.
Peameal = 27·56 per cent.
Cornmeal (Common) = 10·25 per cent.
" (Golden) = 8·94 per cent.

## CENTRIFUGAL APPARATUS FOR QUANTITATIVE ANALYSIS.

A piece of apparatus is described by F. Steimtzer in the Zeit. für Analyt. Chem., 1902, 100 (Abst. in Jour. Soc. Chem. Indust., 1903, 562).

The apparatus illustrated on page 31, was designed by me, and worked out with the assistance of Mr. Thornton, machinist, of this city. It has been in continuous use in my laboratory for five years, and has given perfect satisfaction.

It is driven at a rate of 1,500—3,000 revolutions per minute by an electromotor of one and a-half H.P. driving a countershaft from a main shaft and by a half crossed belt ($d^1$).

It consists of a heavy iron base plate ($a$), Figs. 1, 2, 3, 23 inches diameter and 1¾ inches high. Three iron pillars, 15 inches high, support a three armed head-piece ($b$), and between these two is journaled in bearings ($a^1$) the steel shaft ($c$), with driving pulley ($d$). This shaft works on a ball bearing ($e$) at the lower end (Fig. 3) and on a steel point ($f$) at the upper end. It carries a yoke ($g$), shown in detail in Figs. 3 and 4. This yoke supports two steel rings pivoted on steel bearings, into which rings slip easily, the tube supports of copper ($h$, $h^1$) which are of two shapes according as tubes of the form $k$, $l$ or $m$ are used. In Fig. 3 the two different supports are shown in position. These tube supports are of equal weight, so as to be interchangeable. At the bottom of each tube support is slipped a piece of rubber, being an ordinary rubber cork when ($h^1$) is used and the half of a rubber ball ($h^o$) perforated in the centre when ($h$) is used. The glass tubes ($l$) and ($k$) are ordinary, thick walled, test tubes, and must be well annealed. The various operations of precipitation, extraction, washing, &c., are performed in these tubes, the latter operation being done by decantation. after shaking (an operation greatly facilitated by a specially constructed shaking machine. The precipitate is usually packed down so firmly in the bottom of the tube after 5—10 minutes centrifuging, that the wash water can be poured off to the last drop or two. The tube ($m$) is a specially constructed separating funnel (about 175 cc. capacity) of such a form as to fit the tube support. The most troublesome emulsions are easily separated by the centrifuge.

In Fig. 1 is shown a cover ($n$) made of ⅛ inch steel plate, capable of being pulled down over the machine when in use as a safety protection. This is counterpoised by a weight (shown at ($p$) in Fig. 2), suspended on a cord running over friction pulleys which are supported by the top frame. The cover is running on guide rods ($q$) in guides ($r$). The tubes ($k$) hold about 30 cc. and are naturally preferred when sufficiently large for the work in hand. Tubes ($l$) hold about 125 cc.

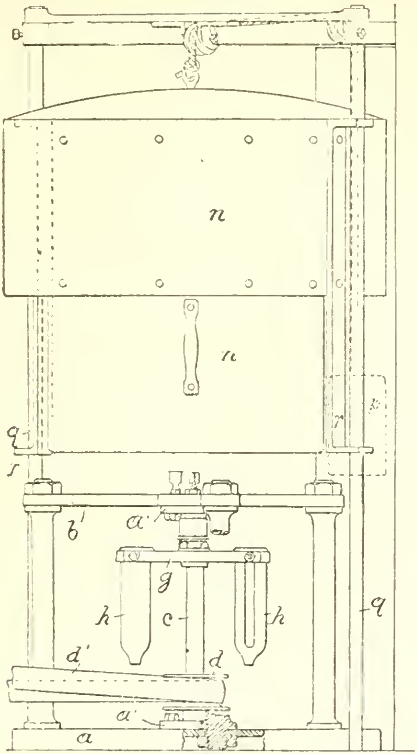

Fig 1

Fig 6

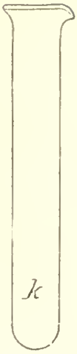

Fig 5

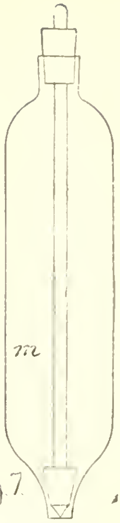

Fig. 7

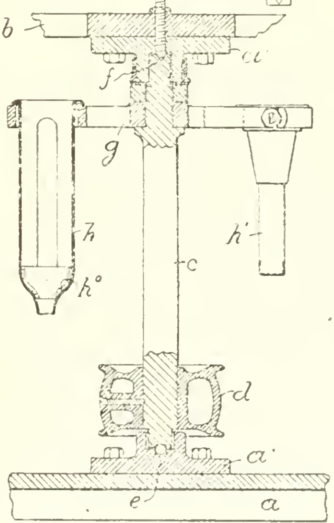

Fig. 3

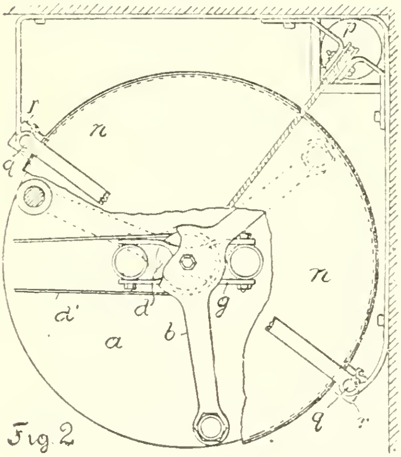

Fig 2

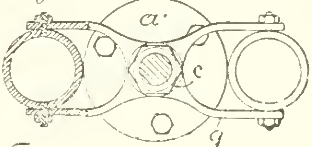

Fig 4

## APPENDIX D.

## BULLETIN No. 85.—CANNED MEATS.

OTTAWA, June 10, 1903.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—I have to transmit, herewith inclosed, a report by Mr. McGill on the samples of canned meats which were collected in accordance with your instructions of March 27 last. The report is accompanied by a table showing the source of the samples.

I have the honour to be, sir,
Your obedient servant,
THOMAS MACFARLANE,
*Chief Analyst.*

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LABORATORY OF THE INLAND REVENUE DEPARTMENT,
OTTAWA, June 9, 1903.

THOS. MACFARLANE, Esq., F.R.S.C.,
Chief Analyst, Inland Revenue Department.

SIR,—I beg to hand you herewith a report on 99 samples of canned meats.

In two (2) of these samples the meat was quite spoiled; in three (3) others it was slightly spoiled. The remaining ninety-four (94) samples were in good condition.

It is worthy of note that one of the slightly spoiled samples contained boric acid. This fact may imply that the meat was not in good condition when put up; but it would be going too far to hold this as proved.

With this exception, all samples containing preservatives, were found to be in good condition.

All samples have been examined for preservatives. The only preservative found is boric acid, probably added in part as borax.

This has been found in twenty-one (21) samples, as follows:—

| | Samples. |
|---|---|
| Chicken | 4 |
| Turkey | 1 |
| Wild duck | 1 |
| Pâté de foie gras | 1 |
| Tongue | 3 |
| Ham | 3 |
| Chicken, ham and tongue | 1 |
| Canned beef | 3 |
| Smoked " | 2 |
| Pigs feet | 1 |
| Brawn | 1 |
| Total | 21 |

These represent the products of the following manufacturers, viz :—

W. Clark & Co., Montreal.
Canadian Packing Co., London.
Laing Packing Co., Montreal.
Beardsley & Sons, New York.

In no case has the quantity of boric acid found exceeded the limit fixed by the British Parliamentary Commission, viz :—0·5 per cent—and in most cases it has fallen markedly below this amount.

I have the honour to be, sir,

Your obedient servant,

A. McGILL.

| Date of Collection. | Nature of Sample. | No. of Sample. | Name and Address of Vendor. | Quantity. | Cost. | Name and Address of Manufacturer or Furnisher. | Preservatives. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 1903. | | | *District of Halifax, &c.* | | $ cts | | | |
| April 16 | Canned beef | 20238 | F. H. Bartean, Yarmouth, N.S. | 3 bots. | 0 40 | Laing Packing Co., Montreal | None | Good condition. |
| " 16 | " tongue | 20253 | Murphy & Demont, Windsor, N.S. | 3 cans | 0 36 | Clark & Co., Montreal | Boric acid, less than 0·5 p. c. | " |
| " 20 | " ham | 20256 | Shand Bros., Windsor, N.S. | 3 " | 0 30 | Libby, McNeil & Libby, Chicago. | None | " |
| " 20 | " turkey | 20257 | Wentforth Stores, Windsor, N.S. | 3 " | 0 30 | " " | " | " |
| " 27 | Potted ham. | 20307 | R. T. Forristall, Halifax, N.S. | 3 " | 0 30 | " " | " | " |
| " 27 | " tongue | 20310 | R. Urquhart & Son, Halifax, N.S. | 3 " | 0 30 | " " | " | " |
| " 27 | Canned chicken | 20311 | W. J. Hopgood, Halifax, N.S. | 3 " | 0 30 | W. Clark, Montreal | Boric acid, less than 0·5 p. c. | " |
| " 30 | Corned beef | 20317 | Jas. Scott & Co., Halifax, N.S | 3 " | 0 45 | " | None | " |
| " 30 | Potted ham. | 20318 | H. W. Wentzell, Halifax, N.S. | 3 " | 0 18 | Wm. Davis, Toronto | " | Meat was very badly decomposed. |
| " 30 | " tongue | 20319 | " " | 3 " | 0 21 | Libby, McNeil & Libby, Chicago. | " | Good condition. |
| " 17 | Corned beef | 4319 | Geo. Rackham, Charlottetown | 3 " | 0 60 | | " | " |
| " 17 | Pigs feet | 4323 | L. MacNutt, Charlottetown | 3 " | 0 25 | B. & M. Rattenberg, Charlottetown | " | " |
| " 17 | Corned beef | 4324 | " " | 3 " | 0 60 | | " | " |
| " 23 | Roast mutton | 4342 | Beck & Goff, Charlottetown | 3 " | 0 84 | | " | " |
| " 20 | Chicken | 4331 | Brace, McKay & Co., Summerside | 3 " | 0 60 | | " | " |
| | | | *District of New Brunswick.* | | | | | |
| " 11 | Canned beef | 17859 | L. F. Worden, 73 Sydney St., St. John. | 3 cans | 0 48 | W. Clark, Montreal. | None. | Good condition. |
| " 13 | " ham | 17860 | Wm. Baxter, 71 Pitt St., St. John. | 3 " | 0 60 | Libby, McNeil & Libby, Chicago. | " | " |
| " 14 | Lunch tongue | 17871 | Baird & Peters, 16-20 Ward St., St. John. | 3 " | 0 66 | Packed in Canada for Baird & Peters | " | " |
| " 16 | Sliced bacon | 17878 | W. B. McKay & Co., Main St., Sussex | 3 " | 0 57 | Libby, McNeil & Libby, Chicago. | " | " |
| " 17 | Beef loaf | 17883 | W. G. Bell, 314 Main St., Moncton | 3 " | 0 75 | " " | " | " |
| " 17 | Veal loaf | 17892 | A. K. McLean & Co., 293 Main St., Moncton | 3 " | 0 45 | " " | " | " |
| " 17 | Lunch tongue | 17898 | Hugh McKenna, King St., St. Stephen | 3 " | 0 90 | B. & M. Rattenberg, Charlottetown | " | " |
| " 23 | " | 17907 | John Graham, Queen St., Woodstock | 3 " | 0 90 | Wm. Davies Co., Toronto. | " | Meat was slightly discoloured. |
| " 23 | Lamb's tongue | 17911 | Noble & Trafton, 64 Main St., Woodstock. | 3 " | 0 75 | " " | " | Good condition. |
| " 25 | Jellied hocks | 17913 | M. R. Logan, Queen St., Fredericton | 3 " | 0 90 | Libby, McNeil & Libby, Chicago. | " | " |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | *District of Quebec.* | | | | | |
| April 17 | Chicken, ham and tongue | 23342 | H. Robert, St. Hyacinthe | 3 cans | 0 36 | Wm. Clark, Montreal | None | Good condition. |
| " 20 | Canned beef | 23345 | H. Bisaillon, St. Lambert | 3 " | 0 60 | Armour Packing Co., Kansas City | " | " |
| " 21 | Cooked tongue | 23355 | Gerard et Corbiere, Lacolle | 3 " | 1 00 | Wm. Clark, Montreal | " | " |
| " 21 | Cooked beef | 23356 | " " | 3 " | 0 45 | " | " | " |
| 21 | Boneless turkey | 23357 | " " | 3 " | 0 75 | Simcoe Canning Co., Simcoe | " | " |
| " 29 | Canned meat | 23376 | L. F. Denechaud, Three Rivers | 3 " | 0 45 | Libby, McNeil & Libby, Chicago | " | " |
| " 29 | " | 23377 | " " | 3 " | 0 45 | " " | " | " |
| May 1 | Pâté de foie | 23386 | J. E. Pichette, Joliette | 3 " | 0 45 | Canadian Pkg. Co., London, Ont. | Boric acid | " |
| " 7 | Pigs feet | 23391 | Victor Gervais, St. Hyacinthe | 3 " | 0 45 | Libby, McNeil & Libby, Chicago. | None | " |
| | | | *District of Montreal.* | | | | | |
| April 25 | Corned beef | 21274 | A. Archambault, 2045 St. James St., St. Henri | 3 tins | 0 45 | Wm. Clark, Montreal | None | Good condition. |
| " 25 | Pâté de foie gras | 21275 | Z. Trudeau, 3571 N. Dame St., St. Henri | 3 " | 0 30 | A. Groll, Montreal | " | " |
| " 25 | Devilled chicken | 21276 | " " " | 3 " | 0 30 | W. Clark, Montreal. | Boric acid | " |
| " 29 | Potted turkey | 21277 | Laing Packing Co., Montreal | 3 " | 0 30 | Vendors | " | " |
| " 29 | Corned beef | 21278 | " " | 3 " | 0 37 | " | None | Meat quite spoiled. |
| " 29 | English brawn | 21279 | " " | 3 " | 0 38 | " | " | Good condition. |
| May 8 | Pigs feet | 21280 | E. Limoges, 1949 N. Dame St., Montreal. | 3 " | 0 45 | W. Clark, Montreal | Boric acid | " |
| " 8 | Beef | 21281 | L. P. Lavoie, 3187 N. Dame St., Montreal. | 3 " | 0 30 | Libby, McNeil & Libby, Chicago. | None | " |
| " 8 | Ham | 21282 | " " " | 3 " | 0 30 | " " | " | " |
| " 8 | Lunch beef | 21283 | W. J. Maloney, 468 St. Antoine St., St. Cunegonde | 3 " | 0 50 | W. Clark, Montreal | Boric acid | " |
| | | | *District of Toronto.* | | | | | |
| April 15 | Tongue | 23421 | R. English, 190 Yonge St., Toronto | 3 tins | 0 15 | W. Clark, Montreal | Boric acid | Good condition. |
| " 15 | Ham | 23422 | " " " | 3 " | 0 15 | " " | " | " |
| " 15 | Potted ham | 23423 | Wm. Davies Co., Ltd., 444 Yonge St., Toronto | 3 " | 0 30 | Vendors | None | " |
| " 15 | Potted beef | 23424 | " " " | 3 " | 0 30 | " | " | " |
| " 15 | Corned beef | 23425 | " " " | 3 " | 0 30 | " | " | Meat slightly discoloured. |
| April 16 | Chicken | 23426 | J. M. Bothwell, Dunlop St., Barrie | 3 " | 0 23 | W. Clark, Montreal | Boric acid | Good condition. |
| " 16 | Beef loaf | 23427 | " " | 3 " | 0 45 | Libby, McNeil & Libby, Chicago. | None | " |
| " 16 | Chicken, ham and tongue | 23428 | James Vair " | 3 " | 0 38 | W. Clark, Montreal | Boric acid | " |
| " 16 | Ham loaf | 23429 | Hobley Bros. " | 3 " | 0 45 | Libby, McNeil & Libby, Chicago. | None | " |
| " 17 | Potted beef | 23430 | John A. Carpenter, Market Sq., Hamilton. | 3 " | 0 15 | Armour & Co. | " | " |
| | | | *District of Kingston.* | | | | | |
| April 20 | Wild duck | 23118 | H. T. Hamly, Walton St., Port Hope | 3 tins | 0 15 | W. Clark, Montreal | Boric acid | Good condition. |
| " 20 | Potted tongue | 23119 | " " " | 3 " | 0 30 | Wm. Davies Co., Toronto | None | " |
| " 20 | Potted ham | 23120 | " " " | 3 " | 0 30 | " " | " | " |
| " 22 | Ox tongue | 23121 | Jas. Mayberry & Co., Prescott, Ont. | 3 " | 0 45 | Armour & Co. | " | " |
| " 22 | Sausage | 23122 | " " " | 3 " | 0 45 | " | " | " |

| Date of Collection. | Nature of Sample. | No. of Sample. | Name and Address of Vendor. | Quantity. | Cost. | Name and Address of Manufacturer or Furnisher. | Preservatives. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 1903. | | | *District of Kingston.* | | $ cts. | | | |
| April 22 | Boned chicken | 23123 | R. McGregor, Sparks St., Ottawa | 3 tins | 0 75 | Aylmer Canning Co. | None | Good condition. |
| " 22 | Strausberg meat | 23124 | " " " | 3 " | 0 30 | A. Defourier Co., Ltd., London | " | " |
| " 30 | Corned beef | 23125 | G. W. Runions, Marlboro St., Cornwall | 3 " | 0 45 | Laing Packing Co., Montreal | " | " |
| " 20 | Veal loaf | 23116 | W. H. Hamilton, Simcoe St., Peterboro | 3 " | 0 45 | Libby, McNeil & Libby, Chicago. | " | " |
| " 20 | Smoked beef | 23136 | E. Brown & Co., George St. " | 3 " | 0 60 | W. Clark, Montreal | Boric acid | " |
| | | | *District of London.* | | | | | |
| April 9 | Canned beef | 22044 | J. W. Irwin, Clinton, Ont | 3 tins | 0 45 | W. Clark, Montreal | Boric acid | Good condition. |
| " 9 | " " | 22046 | Sturdy & Co., Goderich | 3 " | 0 45 | Laing Packing Co., Montreal | None | " |
| " 13 | Potted ham | 22050 | J. C. Jones, Stratford, Ont | 3 " | 0 30 | Libby, McNeil & Libby | " | " |
| " 13 | Potted tongue | 22051 | W. W. Hill, Mitchell, Ont | 3 " | 0 15 | W. Clark, Montreal | Boric acid | " |
| " 13 | Ham loaf | 22053 | W. R. Cole " | 3 " | 0 45 | Libby, McNeil & Libby, Chicago. | None | " |
| " 13 | Veal loaf | 22054 | " " | 3 " | 0 45 | " " | " | " |
| " 15 | Canned meat | 22059 | Andrew Young, Seaforth | 3 " | 0 37 | W. Clark, Montreal | Boric acid | " |
| " 15 | " chicken | 22060 | Peter Dill " | 3 " | 0 30 | " | " | " |
| " 16 | " beef | 22062 | Beck & Schell, Berlin | 3 " | 0 45 | " | None | " |
| " 16 | " sausage | 22063 | " " | 3 " | 0 45 | Libby, McNeil & Libby, Chicago. | " | " |
| " 16 | " tongue | 22064 | " " | 3 " | 0 15 | Armour & Co., Chicago | " | " |
| | | | *District of Winnipeg.* | | | | | |
| April 15 | Corned beef | 17428 | B. Tobias Co., Morden | 1 lb. | 0 60 | Wm. Clark, Montreal | None | Good condition. |
| " 15 | Lunch tongue | 17432 | T. E. McGirr Co., Morden | 1 " | 1 05 | " | " | " |
| " 16 | Boneless chicken | 17434 | S. Shannon Co., Ltd., Killarney | | 0 90 | Lalor Canning Co., Dunnville, Ont | " | " |
| " 17 | Sausages | 17435 | Hudson Bay Co., Deloraine | | 0 60 | W. Clark, Montreal | " | " |
| " 17 | Sliced smoked beef | 17436 | Hudson Bay Co., Deloraine | | 1 05 | Beardsley & Sons, New York | Boric acid | " |
| " 20 | Veal loaf | 17441 | Hamelin Bros., Melita | 3 cans | 0 60 | German American Prov. Co. | None | " |
| " 20 | English brawn | 17442 | I. McJannett, Melita | 3 " | 1 00 | Wm. Clark, Montreal | Boric acid | " |
| " 21 | Ham loaf | 17445 | W. J. Wilson, Virden | 3 " | 0 90 | Libby, McNeil & Libby, Chicago. | None | " |
| " 24 | Sliced bacon | 17456 | G. Kennedy, Carberry | 3 " | 1 05 | " " | " | " |
| " 25 | Head cheese | 17457 | T. A. Garland, Portage la Prairie | 3 " | 0 75 | " " | " | " |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | *District of Manitoba.* | | | | | |
| April 21 | Corned beef | 21713 | Phillips Bros., Red Deer | 3 tins | 0 75 | W. Clark, Montreal | None | Good condition. |
| " 23 | Pigs' feet | 21717 | N. W. Gould, Wetaskiwin | 3 " | 1 00 | Aylmer Canning Co. | " | " |
| " 24 | Lunch tongue | 21722 | McDougall & Secord, Edmonton | 3 " | 1 00 | W. Clark, Montreal. | " | " |
| " 25 | Canned ham | 21725 | McLaren, Strathcona | 3 " | 0 75 | " " | Boric acid | Meat slightly discoloured. |
| " 29 | Corned beef | 21728 | E. Mathews, Calgary | 3 " | 0 60 | " " | None | Good condition. |
| | | | *District of British Columbia.* | | | | | |
| " 16 | Mutton | 21687 | A. T. Charleton, Port Haney | 2 cans | 0 35 | W. Davies Co., Toronto | " | " |
| " 16 | Devilled ham | 21693 | H. Alder, Mt. Lehman, B.C. | 2 " | 0 25 | W. Clark, Montreal. | Boric acid | " |
| " 17 | Corned beef | 21697 | H. C. Henderson, Chilliwack | 2 " | 0 40 | Laing Pkg. Co., Montreal | None | " |
| " 17 | " | 23502 | G. R. Ashwell Sons, Chilliwack | 2 " | 0 40 | Davies & Son, Toronto | " | " |
| " 17 | Lunch tongue | 23504 | Mrs. E. A. Farrer, Chilliwack | 2 " | 0 35 | Aylmer Canning Co. | " | " |
| " 17 | Veal loaf | 23507 | The Harrison River Mills Timber and Trading Co., B.C. | 3 " | 0 60 | Libby, McNeil & Libby | " | " |
| " 18 | Lunch tongue | 23511 | M. Desbrisay & Co., Mission, B.C. | 3 " | 0 90 | Canadian Pkg. Co., London, Ont. | " | " |
| " 18 | Devilled ham | 23514 | J. Plumridge, Mission, B.C. | 3 " | 0 45 | Armour & Co., Chicago | " | " |
| " 18 | Lunch tongue | 23517 | S. Petersky, Steveston, B.C. | 2 " | 0 70 | Simcoe Canning Co. | " | " |
| " 21 | Potted beef | 23521 | E. Hunt, Steveston | 3 " | 0 30 | C. & E. Morton, London | " | " |

## APPENDIX E.

## BULLETIN No. 86.—FERTILIZERS, 1903.

OTTAWA, June 21, 1903.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—I submit herewith a tabulated statement, marked Table I., containing a description of 128 standard samples of agricultural fertilizers, which were sent in to the Department of Inland Revenue by their manufacturers, importers or vendors, in accordance with the provisions of the Fertilizers Act, 1890, and as representing the goods which it was proposed to offer for sale in Canada during the season, 1903–4. There is a slight increase in the number of standard samples this year compared with the three preceding seasons, as will be evident from the following statement :—

| | | | |
|---|---|---|---|
| In 1897 | there were | 107 | standard samples submitted. |
| 1898 | " | 124 | " " " |
| 1899 | " | 154 | " " " |
| 1900 | " | 107 | " " " |
| 1901 | " | 102 | " " " |
| 1902 | " | 106 | " " " |
| 1903 | " | 128 | " " " |

Table I. gives the designations of the various brands of fertilizers, the names of the manufacturers, the claims made as regards their contents in fertilizing ingredients, and the actual quantities of these found in the standard samples on analysis in this laboratory. The guaranteed contents are given in the upper line, and the analytical results in the second line placed opposite the designation of the fertilizer. In many cases the claims made are imperfect and indefinite, and, in some, the requirements of the Act calling for a certificate of analysis, and a statement of the materials used in the manufacture of the fertilizer have been neglected. With regard to indefinite claims it may be mentioned that these are often made by reputable makers, when a particular fertilizer is described as containing say 'from 2.5 to 3.0 p.c. of ammonia,' or 'from 8 to 9 of available phosphoric acid,' or 'from 9.5 to 11.0 p.c. of potash.' In such instances if an ingredient is found deficient, and the sample is challenged, the manufacturer often defends himself by maintaining that his guarantee does not extend above the lowest of the figures mentioned. For this reason the 'guaranteed contents' of a fertilizer, as stated in Table I, must be understood to indicate only the lowest percentage given in the manufacturers' label, or in his communications to the department.

As required by the Fertilizer Act, Table I. also contains a column in which 'the relative value of each fertilizer calculated from the contents in fertilizing ingredients' is given, the prices of these ingredients being as follows :—

| | Cents Per Lb. |
|---|---|
| Nitrogen in salts of ammonia or nitrates, as well as in compound fertilizers | 13 |
| Organic nitrogen in ground bone, fish, blood or tankage | 12 |
| Phosphoric acid :— | |
| Soluble, in water | 6 |
| Soluble, in 1 p.c. citric acid | 5½ |
| Insoluble in Thomas phosphate powder | 3½ |
| Insoluble, in ground rock phosphate and fertilizers generally | 1½ |
| Potash, contained in wood ashes | 6 |
| Potash from high grade salts | 5¼ |

The valuation of each brand is calculated on the results of the analysis of the standard samples, but it has been omitted in the case of the guaranteed contents on account of the imperfect character of the information supplied in the majority of cases.

I have also to submit a description of the fertilizer samples which were collected, as sold in the open market, in accordance with the instructions received from you on 27th March last. This description is called Table II, and contains the date of collecting the samples, the names of the vendors and manufacturers, the designation of the brand, and the results of the analyses. The figures obtained in examining the sample as sold are given in the third line following the name of the fertilizer, and on the second will be found the analysis of the corresponding standard sample, as well as its valuation. In cases where no standard samples have been sent in to the department and, nevertheless, in contravention of the Fertilizer Act, the fertilizers have been offered for sale it has of course not been found possible to give either the guaranteed contents or the analysis of a standard sample. The number of such fertilizers not registered and therefore illegally sold, amounts to ten, which is slightly less than in former years.

According to the opinions expressed by the analysts 9 out of the 84 samples collected as sold have been found to be adulterated, according to the Act, being deficient in available phosphoric acid or other fertilizing constituents, or have been indicated as being 'below guarantee.' It not unfrequently happens that the fertilizing constituents of the standard samples show higher percentages than claimed in the guarantee of the manufacturers. Nevertheless, the latter must be used by the analysts in judging of the genuineness of a sample, and where the figures of the guarantee are defective it becomes almost impossible to give an opinion. It is therefore very important that when standard samples are supplied by vendors or manufacturers, they should be accompanied by certificates of analysis, or at least by a statement of the lowest guaranteed percentages of every fertilizing constituent present.

It will be remembered that in my report of May 13, 1901, (Bulletin No. 75) the proceedings were fully detailed which led to an alteration in the method of determining the available phosphoric acid in fertilizers, the adoption of which was then authorized by the Commissioner of Inland Revenue, and has since been carried out in this laboratory and in those of the district analysts. Since many manufacturers in the United States still continue to mention, in their guarantees, a percentage of 'reverted' phosphoric acid, it seems necessary to state that in Canada a determination of 'citric soluble' phosphoric acid is made, and the determination of 'reverted' discontinued. It would also seem to be advisable to repeat here the details of the process adopted in Canada for ascertaining the percentage of 'available' phosphoric acid contained in agricultural fertilizers:—

*Citric insoluble phosphoric acid.*

*(a)* In acidulated samples—Introduce the filter containing the washed residue from the determination of soluble phosphoric acid in two grammes of the original sample into a flask with 100 cc of 1 per cent citric acid solution, stopper tightly and shake violently until the filter paper is reduced to a pulp. Add 100 cc additional of the 1 per cent citric acid solution and digest at room temperature for half an hour, shaking the flasks thoroughly every five minutes. With five analyses in hand this means an agitation of one minute duration repeated six times. Filter and wash thoroughly. Dry and transfer the filter and its contents to a crucible, ignite until all organic matter is destroyed, add from 10 to 15 cc of strong nitric or hydrochloric acid and digest until all phosphate is dissolved. Dilute the solution to 200 cc, mix well, filter through a dry filter and proceed as for the estimation of total phosphoric acid.

*(b)* In non-acidulated samples—In case a determination of citric insoluble phosphoric acid is required in non-acidulated samples, such as mineral phosphates basic slag, Thomas phosphate powder, ground bone, bone char or bone ash, it is to be made by taking two grammes of the phosphatic material (without previous washing with water) and introducing it into a flask with 100 cc of a 5 per cent solution of ammonium chloride and boiling it for forty minutes, replacing always the evaporated water, then filtering

and washing the residue and treating it, exactly as above described with 1 per cent citric acid solution, determining the phosphoric acid in the residue.

*Citric Soluble Phosphoric Acid.*—The sum of the water-soluble and the citric-insoluble phosphoric acid subtracted from the total contained in the fertilizer gives the citric-soluble phosphoric acid.

The sum of the latter and the water-soluble phosphoric acid is to be regarded as 'available phosphoric acid.'

I beg to recommend the publication of this report, together with Tables I and II, as well as the 'Memoranda on Manures,' which it has been customary to print at the same time.

I have the honour to be, sir,
Your obedient servant,

THOMAS MACFARLANE,
*Chief Analyst.*

# STANDARD SAMPLES OF COMMERCIAL FERTILIZERS

Table I.—Statement of the results of examining 128

| Number of Sample. | Designation. | Name of Manufacturer. | By whom sent. | From what Materials Produced. | —— |
|---|---|---|---|---|---|
| 1363 | Great Eastern Grass and Oats Fertilizer. | American Agricultural Chemical Co. | Great Eastern Fertilizer Branch. Rutland, Vermont. | .... | Guaranteed contents<br>Standard sample.... |
| 1364 | Great Eastern Northern Corn Special Fertilizer. | ″ | ″ | .... | Guaranteed contents<br>Standard sample ... |
| 1365 | Great Eastern General Fertilizer. | ″ | ″ | .... | Guaranteed contents<br>Standard sample.... |
| 1366 | Great Eastern Potatoe Manure Fertilizer. | ″ | ″ | .... | Guaranteed contents<br>Standard sample. .. |
| 1367 | Plain Superphosphate. | ″ | ″ | .... | Guaranteed contents<br>Standard sample. .. |
| 1368 | Essex Complete for Corn, Grain and Grass Fertilizer. | Russia Cement Co. | S. C. Shaffner, Granville Ferry, N.S. | .... | Guaranteed contents<br>Standard sample ... |
| 1369 | Essex Complete for Potatoe, Roots and Vegetable. | ″ | ″ | .... | Guaranteed contents<br>Standard sample.... |
| 1370 | Fish and Potash .... | ″ | ″ | .... | Guaranteed contents<br>Standard sample.... |
| 1371 | Essex Orchard Fertilizer. | ″ | ″ | .... | Guaranteed contents<br>Standard sample.... |
| 1372 | Essex Dry Ground Fish. | ″ | ″ | .... | Guaranteed contents<br>Standard sample.... |
| 1373 | Essex Raw Bone... | ″ | ″ | .... | Guaranteed contents<br>Standard sample ... |
| 1374 | Essex 'A 1' Superphosphate. | ″ | ″ | .... | Guaranteed contents<br>Standard sample ... |
| 1375 | Potatoe Phosphate.. | Provincial Chemical Fertilizer Co., St. John, N.B. | Manufacturers ... | .... | Guaranteed contents<br>Standard sample.... |
| 1376 | Imperial Superphosphate. | ″ | ″ | .... | Guaranteed contents<br>Standard sample ... |
| 1377 | Fruit Tree Fertilizer | ″ | ″ | .... | Guaranteed contents<br>Standard sample. .. |
| 1378 | Victor Guano....... | ″ | ″ | .... | Guaranteed contents<br>Standard sample.... |
| 1379 | Bone Meal.......... | ″ | ″ | .... | Guaranteed contents<br>Standard sample.... |
| 1380 | Bone, Blood and Potash. | ″ | ″ | .... | Guaranteed contents<br>Standard sample.... |
| 1381 | Exhibit 'B' ..... | Wm. Davies Co., Limited, Toronto | ″ | Dried Blood, Bones and Tankage. | Guaranteed contents<br>Standard sample... |
| 1382 | Exhibit 'A'........ | Harris Abattoir Co., Ltd. | Edward Adie, Secretary Treasurer, Toronto. | ″ | Guaranteed contents<br>Standard sample.... |
| 1383 | Capelton Superphosphate. | Nichols Chemical Co. of Canada, Ltd. Capelton, P.Q. | S. L. Spafford, Manager, Capelton, Que. | Canadian Apatite dissolved in Sulphuric Acid, Muriate of Potash, and Sulphate of Ammonia. | Guaranteed contents<br>Standard sample.... |

Standard Samples of Commercial Fertilizers, registered for 1903

RESULTS OF ANALYSIS.

| Nitrogen. | | Phosphoric Acid. | | | | | Potash. | Moisture. | Relative value per ton of 2,000 lbs | Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Total including that of Nitric Acid and Ammonia. | Total calculated as Ammonia. | Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | |
| ...... | ...... | 6·00 | ...... | 1·00 | 12·00 | 11·00 | ... | ...... | ...... | |
| 0·77 | 0·93 | 11·19 | 0·00 | 2·88 | 14·07 | 11·19 | 6·24 | 10·90 | 21·04 | Miss S. E. Wright. |
| .... | 2·50 | 5·00 | ...... | 2·00 | 10·00 | 8·00 | 1·50 | ...... | ...... | |
| 1·95 | 2·36 | 8·15 | 0·33 | 3·51 | 11·99 | 8·48 | 1·80 | 12·40 | 18·15 | " |
| .... | 1·00 | 5·00 | ...... | 1·00 | 10·00 | 8·00 | 4·00 | ...... | ...... | |
| 1·05 | 1·27 | 7·03 | 4·01 | 2·56 | 13·60 | 11·04 | 4·48 | 12·60 | 21·05 | " |
| ..... | 2·50 | 5·00 | ...... | 1·00 | 10·00 | 8·00 | 3·00 | ...... | ...... | |
| 1·90 | 2·31 | 7·99 | 2·07 | 3·21 | 13·27 | 10·06 | 2·99 | 13·60 | 20·87 | " |
| ...... | ...... | ...... | ...... | 1·00 | 15·00 | 14·00 | ...... | ...... | ...... | |
| 0·31 | 0·37 | 11·04 | 2·40 | 4·95 | 18·39 | 13·44 | .... | 11·70 | 18·16 | " |
| ...... | 4·00 | 3·00 | ...... | 2·50 | 9·50 | 7·00 | 9·50 | ...... | ...... | |
| 2·58 | 3·13 | 6·72 | 2·40 | 2·23 | 11·35 | 9·12 | 10·50 | 3·60 | 35·17 | Miss E. Davidson. |
| ...... | 4·50 | 3·00 | ...... | 2·00 | 9·00 | 7·00 | 9·00 | ...... | ...... | |
| 3·29 | 4·00 | 7·03 | 3·05 | 3·99 | 14·07 | 10·05 | 8·82 | 6·84 | 30·78 | " |
| ...... | 2·50 | 4·50 | ...... | 3·00 | 12·00 | 9·00 | 2·25 | ..... | ...... | |
| 2·18 | 2·67 | 5·60 | 5·11 | 4·15 | 14·86 | 10·71 | 4·16 | 9·72 | 23·18 | " |
| ..... | 2·00 | 4·00 | ...... | 3·00 | 9·00 | 8·00 | 8·50 | ...... | ...... | |
| 2·56 | 3·11 | 4·48 | 4·00 | 5·11 | 13·59 | 8·48 | 9·50 | 6·20 | 27·42 | " |
| 8·00 | ...... | ...... | ...... | ...... | 11·00 | ...... | ... | 8·00 | ...... | |
| 8·02 | 9·74 | 2·07 | 10·73 | 3·03 | 15·83 | 12·80 | 0·32 | 8·24 | 34·78 | " |
| 3·50 | 4·00 | ...... | ...... | .... | 18·00 | ...... | ... | ...... | ...... | |
| 5·00 | 6·07 | ...... | 12·79 | 12·95 | 25·74 | 12·79 | | 7·64 | 29·95 | " |
| ...... | 1·25 | ...... | ...... | ..... | 9·00 | 7·00 | 2·00 | ...... | ...... | |
| 1·09 | 1·32 | 3·36 | 6·88 | 4·31 | 14·55 | 10·24 | 3·28 | 4·56 | 19·16 | " |
| ...... | 3·75 | ...... | ...... | ...... | ...... | 8·00 | 6·50 | ...... | .... | |
| 3·19 | 3·87 | 6·71 | 1·63 | 4·77 | 13·11 | 8·34 | 5·23 | 10·00 | 25·05 | Miss S. E. Wright. |
| .... | 3·00 | ...... | ..... | ... | ...... | 10·50 | 1·50 | ...... | ...... | |
| 3·03 | 3·68 | 7·35 | 2·73 | 7·67 | 17·75 | 10·08 | 1·35 | 11·65 | 23·41 | " |
| ...... | 3·00 | ...... | ...... | .... | ...... | 8·00 | 6·00 | ...... | ...... | |
| 3·02 | 3·67 | 8·15 | 1·48 | 4·60 | 14·23 | 9·63 | 3·55 | 10·80 | 26·00 | " |
| ...... | 2·00 | ...... | ...... | ..... | ...... | 7·00 | 2·50 | ...... | ...... | |
| 1·95 | 2·36 | 6·08 | 3·20 | 6·55 | 15·83 | 9·28 | 3·00 | 12·15 | 21·00 | " |
| ...... | 3·10 | ...... | ...... | ..... | 24·14 | ...... | ..... | ...... | ...... | |
| 4·62 | 5·61 | ...... | 14·88 | 6·07 | 20·95 | 14·88 | .... | 7·50 | 29·28 | " |
| ...... | 2·00 | ...... | ...... | ...... | ...... | 7·00 | 4·00 | ...... | ...... | |
| 1·64 | 2·00 | 6·88 | 2·24 | 6·39 | 15·51 | 9·12 | 6·27 | 7·15 | 23·16 | " |
| 7·14 | 8·67 | ...... | ...... | ..... | 13·67 | ...... | ..... | 9·45 | ...... | |
| 6·97 | 8·46 | trace.... | 14·23 | 1·92 | 16·15 | 14·23 | 7·74 | 6·45 | 41·09 | " |
| 7·21 | 9·43 | ...... | ...... | ..... | 8·61 | ...... | .... | 6·90 | ...... | |
| 8·65 | 10·51 | 1·60 | 2·24 | 1·44 | 5·28 | 3·84 | 0·44 | 7·20 | 26·03 | " |
| ...... | ...... | ...... | ...... | ... | ...... | 8·00 | ..... | ...... | ...... | |
| 2·09 | 2·53 | 8·15 | 2·57 | 6·07 | 16·79 | 10·72 | 2·18 | 11·25 | 22·15 | " |

TABLE I.—Statement of the Results of Examining 128 Standard Samples

| Number of Sample. | Designation. | Name of Manufacturer. | By whom sent. | From what Materials Produced. | — |
|---|---|---|---|---|---|
| 1384 | No. 1 Grade ....... | Nichols Chemical Co. of Canada, Ltd. Capelton, P.Q. | S. L. Stafford, Manager, Capelton, Que. | Canadian Apatite dissolved in Sulphuric Acid, Muriate of Potash, and Sulphate of Ammonia. | Guaranteed contents<br>Standard sample.... |
| 1385 | Reliance .... ...... | ″ .. | ″ .. | ″ .. | Guaranteed contents<br>Standard sample.... |
| 1386 | Royal Canadian..... | ″ .. | ″ .. | ″ .. | Guaranteed contents<br>Standard sample.. . |
| 1387 | Victor............. | ″ .. | ″ .. | ″ .. | Guaranteed contents<br>Standard sample. .. |
| 1388 | Crown . ......... | ″ .. | ″ .. | ″ .. | Guaranteed contents<br>Standard sample.... |
| 1389 | Reid's Superphosphate. | Thos. Reid, St. John, N.B. | Manufacturer, St. John, N.B. | .... .... ...... | Guaranteed contents<br>Standard sample.... |
| 1390 | Crocker's Wheat and Corn Fertilizer. | American Agricultural Chemical Co., of Buffalo, N.Y. | Geo. W. Bingham, Local Manager. | ............ .. | Guaranteed contents<br>Standard sample ... |
| 1391 | Crocker's Cabbage and Potatoe Manure. | ″ .. | ″ .. | . .......... . | Guaranteed contents<br>Standard sample.... |
| 1392 | Crocker's Harvest Jewel. | ″ .. | ″ .. | ..... ........ .. | Guaranteed contents<br>Standard sample ... |
| 1393 | Crocker's Ammoniated Bone. | ″ .. | ″ .. | .... ............. | Guaranteed contents<br>Standard sample .. |
| 1394 | Fertilizer..... .. . | Laing Packing and Provision Co., Ltd., Montreal. | Manufacturer, Montreal. | Offal, Blood and Bones of Hogs. | Guaranteed contents<br>Standard sample.... |
| 1395 | High Grade Potato Manure. | American Agricultural Chemical Co. of Rutland, Vt. | Great Eastern Fertilizer Branch, Rutland, Vt. | ................. | Guaranteed contents<br>Standard sample ... |
| 1396 | Thomas' Phosphate Powder. | Chemical Works of H. & E. Albert, 15 Philpot Lane, London, Eng. | . ......... .... | Basic slag made at Middlesborough, England. | Standard sample.... |
| 1397 | Williams & Clark American Potato Manure. | American Agricultural Chemical Co. of Boston, Mass. | Ross L. Coe, Local Treasurer, Boston. | . ... ...... | Guaranteed contents<br>Standard sample... |
| 1398 | Pacific Potato Speci'l | ″ ″ .. | ″ ″ .. | . ...... . . | Guaranteed contents<br>Standard sample.... |
| 1399 | Pacific Nobsque Guano. | ″ ″ .. | ″ ″ .. | ............. .... | Guaranteed contents<br>Standard sample.... |
| 1400 | Pacific Fine Ground Bone. | ″ ″ .. | ″ ″ .. | ................. | Guaranteed contents<br>Standard sample.... |
| 1401 | Soluble Pacific Guano | ″ ″ .. | ″ ″ .. | ........ ... . . | Guaranteed contents<br>Standard sample.... |
| 1402 | Tucker's Imperial Bone Superphosphate. | ″ ″ .. | ″ ″ .. | ..... . . .... | Guaranteed contents<br>Standard sample .. |
| 1403 | Bradley's Eclipse Phosphate. | ″ ″ .. | ″ .. | ............... | Guaranteed contents<br>Standard sample... |

of Commercial Fertilizers, registered for 1903—*Continued.*

| RESULTS OF ANALYSIS. | | | | | | | | | Relative value per ton of 2,000 lbs. | Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen. | | Phosphoric Acid. | | | | | Potash. | Moisture. | | |
| Total including that of Nitric Acid or Ammonia. | Total calculated as Ammonia. | Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | | | | |
| p.c. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. | p.c. | $ cts. | |
| ........ | ........ | ........ | ........ | ...... | ........ | 11·50 | ...... | ........ | ........ | |
| trace.... | trace.... | 13·91 | 1·28 | 3·04 | 18·23 | 15·19 | 0·50 | 9·65 | 19·52 | Miss S. E. Wright. |
| ........ | 2·00 | ........ | ........ | ...... | ...... | 6·00 | 2·00 | ........ | ........ | |
| 2·28 | 2·77 | 5·27 | 3·69 | 3·51 | 12·47 | 8·96 | 3·71 | 11·25 | 22·23 | " |
| ...... | 4·00 | ........ | ........ | ...... | ...... | 9·00 | 5·00 | ........ | ...... | |
| 4·21 | 5·11 | 8·95 | 0·14 | 3·83 | 12·92 | 9·09 | 5·99 | 7·05 | 39·75 | Alphonse Lemoine. |
| ...... | 2·00 | ........ | ........ | . | ...... | 7·00 | 3·00 | ........ | . | |
| 2·53 | 3·07 | 10·55 | 0·97 | 4·40 | 15·92 | 11·52 | 2·94 | 9·90 | 24·69 | " |
| ....... | 2·00 | ........ | ........ | ...... | ........ | 11·00 | 2·50 | ........ | ...... | |
| 2·47 | 3·00 | 7·51 | 3·55 | 2·04 | 13·1 | 11·06 | 4·25 | 12·3 | 24·40 | " |
| ....... | ....... | ........ | ........ | .. | ...... | ....... | .... | ...... | ...... | |
| 3·44 | 4·18 | 4·48 | 2·56 | 5·59 | 12·63 | 7·04 | 3·12 | 19·08 | 22·06 | Miss E. Davidson. |
| 2·06 | 2·50 | 6·00 | ........ | 1·00 | 9·00 | 8·00 | 1·50 | ...... | ...... | |
| 2·75 | 3·34 | 7·51 | 2·09 | 2·71 | 12·31 | 9·60 | 2·37 | 1·20 | 21·74 | " |
| 2·00 | 3·00 | 6·00 | ...... | 1·00 | 9·00 | 8·00 | 6·00 | ...... | ....... | |
| 2·20 | 2·67 | 7·20 | 3·68 | 2·55 | 13·43 | 10·88 | 5·81 | 12·16 | 25·26 | " |
| 1·65 | 2·00 | 6·00 | ...... | 1·00 | 9·00 | 8·00 | 2·00 | ....... | ...... | |
| 1·60 | 2·04 | 7·19 | 1·77 | 2·37 | 11·35 | 8·96 | 2·91 | 10·52 | 18·48 | " |
| 2·40 | 3·00 | 6·00 | ...... | 2·00 | 11·00 | 9·00 | 2·00 | ...... | ...... | |
| 2·66 | 3·23 | 7·36 | 1·76 | 3·19 | 12·31 | 9·12 | 3·08 | 10·44 | 21·22 | " |
| 8·33 | 10·12 | ........ | ....... | .... | 9·40 | ....... | ..... | ...... | .... | |
| 8·36 | 10·15 | 1·28 | 6·88 | 1·75 | 9·91 | 8·16 | 0·27 | 11·96 | 29·97 | " |
| ........ | 4·00 | 6·00 | ...... | 1·00 | 7·00 | 6·00 | 10·00 | ...... | ...... | |
| 3·07 | 3·73 | 4·64 | 3·04 | 2·07 | 9·75 | 7·68 | 9·75 | 7·60 | 27·75 | Miss E. Davidson. |
| ....... | ........ | ........ | 14·55 | 4·00 | 18·55 | 14·55 | ... | 0·20 | 18·80 | " |
| 2·06 | 2·50 | 5·00 | ....... | 2·00 | 10·00 | 8·00 | 3 to 4 | ........ | ....... | |
| 2·41 | 2·92 | 6·72 | 2·72 | 2·71 | 12·15 | 9·44 | 3·32 | 13·88 | 21·66 | " |
| 2·06 | 2·50 | 5·00 | ........ | 2·00 | 10·00 | 8·00 | 3·00 | ....... | ....... | |
| 2·38 | 2·89 | 7·52 | 2·24 | 2·71 | 12·47 | 9·76 | 3·04 | 13·92 | 22·08 | " |
| 1·03 | 1·25 | 6·00 | ....... | 2·00 | 10·00 | 8·00 | 2·00 | ....... | ....... | |
| 1·53 | 1·85 | 6·55 | 1·92 | 3·20 | 11·67 | 8·47 | 2·09 | 13·44 | 17·34 | Miss S. E. Wright. |
| 2·50 | 3·00 | ........ | ....... | ... | 21·00 | ....... | .. | ......... | ...... | |
| 2·57 | 3·13 | ........ | 17·60 | 6·55 | 24·15 | 17·60 | .. | 5·45 | 27·49 | " |
| 2·06 | 2·50 | 5·00 | ...... | 2·00 | 10·00 | 8·00 | 1·50 | ....... | ...... | |
| 1·85 | 2·24 | 7·68 | 1·75 | 2·88 | 12·31 | 9·34 | 1·85 | 14·00 | 19·74 | " |
| 1·03 | 1·25 | 6·00 | ........ | 2·00 | 10·00 | 8·00 | 2·00 | ....... | ....... | |
| 1·51 | 1·84 | 6·08 | 3·19 | 2·56 | 11·83 | 9·27 | 1·64 | 13·45 | 16·91 | " |
| 1·03 | 1·25 | 6·00 | ....... | 2·00 | 10·00 | 8·00 | 2·00 | ...... | ..... | |
| 1·10 | 1·42 | 6·40 | 3·35 | 3·84 | 13·59 | 9·75 | 2·09 | 11·10 | 17·56 | " |

TABLE I.—Statement of the Results of Examining 128 Standard Samples

| Number of Samples. | Designation. | Name of Manufacturer. | By whom sent. | From what Materials Produced. | — |
|---|---|---|---|---|---|
| 1404 | Bradley's XL Superphosphate of Lime. | American Agricultural Chemical Co. of Boston, Mass. | Ross L. Coe, Local Treasurer, Boston. | .... ...... . . | Guaranteed contents<br>Standard sample.... |
| 1405 | Bradley's Potato Fertilizer. | " " .. | " " .. | .................. | Guaranteed contents<br>Standard sample.... |
| 1406 | Bradley's Farmers' New Method Fertilizer. | " " .. | " " .. | ...... .. ....... | Guaranteed contents<br>Standard sample.... |
| 1407 | Bradley's Fine Ground Bone. | " " .. | " " .. | . . ...... ..... | Guaranteed contents<br>Standard sample.... |
| 1408 | Read's Standard Superphosphate. | " " .. | " " .. | ................. | Guaranteed contents<br>Standard sample ... |
| 1409 | Read's Practical Potato Special. | " " .. | " " .. | . ............... | Guaranteed contents<br>Standard sample.... |
| 1410 | Read's Sure Catch Fertilizer. | " " .. | " " .. | .... .... . ...... | Guaranteed contents<br>Standard sample.... |
| 1411 | Quinnipiac Climax Phosphate for all crops. | " " .. | " " .. | ................ | Guaranteed contents<br>Standard sample ... |
| 1412 | Cumberland Superphosphate. | " " .. | " " .. | ... ... ... ..... | Guaranteed contents<br>Standard sample.... |
| 1413 | Cumberland Potato Fertilizer. | " " .. | " " .. | .. . ... ......... | Guaranteed contents<br>Standard sample.... |
| 1414 | Cumberland Fine Ground Bone. | " " .. | " " .. | ......... ... .... | Guaranteed contents<br>Standard sample.. . |
| 1415 | Brand 'H' Fertilizer | W. Harris & Co., Toronto. | Manufacturers.... | .... ... ......... | " ... |
| 1416 | Bone Meal.. ... .. | " " .. | " " .. | .. ........... .. | " ... |
| 1417 | Superphosphates of Lime. | Standard Fertilizer & Chemical Co., Ltd., Smith's Falls, Ont. | R.J. Brodie, President and M'n'g'r, Smith's Falls. | Mineral phosphate, nitrate of soda, sulphate of ammonia, magnesia salts, mineral superphosphates, bone char and fine bone meal. | Guaranteed contents<br>Standard sample ... |
| 1418 | Special Fertilizer ... | " " | .. ......... ..... | " " .... | Guaranteed contents<br>Standard sample.... |
| 1419 | Standard Fertilizer | " " | .. ........ . . .. | " " .. | Guaranteed contents<br>Standard sample.... |
| 1420 | Star Fertilizer ..... | " " | .. .... ........... | " " .. | Guaranteed contents<br>Standard sample.... |
| 1421 | No. 1 Fertilizer..... | " " | .. .... .... ........ | " " .. | Guaranteed contents<br>Standard sample.... |
| 1422 | Royal Fertilizer..... | " " | .. ...... .. .... . | " " .. | Guaranteed contents<br>Standard sample.... |
| 1423 | Bone Meal...... ... | " " | .... ........... | ..... ..... .... | Guaranteed contents<br>Standard sample.... |
| 1424 | Nitrate of Soda..... | " " | ....... ..... | .... .... ... . | Guaranteed contents<br>Standard sample.... |
| 1425 | Freeman's Sure Growth Manure. | W.A. Freeman Co., Ltd., Hamilton, Ont. | Wm. Freeman, Hamilton, Ont. | ............. .. | Guaranteed contents<br>Standard sample.... |
| 1426 | Freeman's Bone and Potash. | " " | ...... ...... . | ... .... ... | Guaranteed contents<br>Standard sample.... |

of Commercial Fertilizers, registered for 1903—*Continued.*

RESULTS OF ANALYSIS.

| Nitrogen. | | Phosphoric Acid. | | | | | Potash. | Moisture. | Relative value per ton of 2,000 lbs. | Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Total including that of Nitric Acid or Ammonia. | Total calculated as Ammonia. | Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | |
| 2·06 | 2·50 | 5·00 | ...... | 2·00 | 10 00 | 8·00 | 1·50 | ...... | ...... | |
| 2·00 | 2·43 | 6·07 | 2·62 | 2·50 | 11·19 | 8·69 | 1·60 | 13·80 | 17 79 | Alphonse Lemoine. |
| 2·06 | 2·50 | 5·05 | ...... | 2·00 | 10·00 | 8·00 | 3·00 | ...... | ...... | |
| 2·07 | 2·51 | 6·07 | 1·39 | 2·23 | 10·23 | 9·00 | 3·48 | 13·95 | 18 46 | " |
| 1·03 | 1·25 | 6·00 | ...... | 2·00 | 10·00 | 8·00 | 2 00 | ...... | ...... | |
| 1·22 | 1·47 | 6 07 | 1·48 | 2·87 | 10·42 | 7·55 | 2·14 | 13·55 | 15 18 | " Below standard required by Fertilizer's Act. |
| 2·50 | 3·00 | ...... | ...... | ...... | 21·00 | ...... | ...... | ...... | ...... | |
| 2·78 | 3·38 | Trace. | 14·40 | 9·27 | 23·67 | 14·40 | ... | 4·25 | 25 29 | Alphonse Lemoine. |
| 0·82 | 1·00 | 5·00 | ...... | 2·00 | 10·00 | 8·00 | 4 00 | ...... | ...... | |
| 1·19 | 1·45 | 5·11 | 4 17 | 3·35 | 12·63 | 9·28 | 4·48 | 12 16 | 19 51 | Miss E. Davidson. |
| 0·82 | 1·00 | 2·00 | ...... | 1·00 | 5·00 | 4·00 | 8·00 | ...... | ...... | |
| 1·06 | 1·29 | 3·99 | 2·41 | 2·07 | 8·47 | 6·40 | 8·69 | 6·04 | 19 95 | " |
| ...... | ...... | 6·00 | ...... | 1 00 | 11·00 | 10·00 | 2·00 | ...... | ...... | |
| 0·20 | 0·24 | 7·83 | 3 20 | 2 72 | 13 75 | 11·03 | 2·28 | 10·92 | 16 65 | " |
| 1·03 | 1·25 | 6·00 | ...... | 2·00 | 10·00 | 8·00 | 2 00 | ...... | ...... | |
| 1·08 | 1·31 | 6·23 | 3·05 | 2·72 | 12·00 | 9·28 | 2·41 | 13·44 | 16 98 | " |
| 2·06 | 2·50 | 5·00 | ...... | 2·00 | 10·00 | 8·00 | 1·50 | ...... | ...... | |
| 2·06 | 2·5 | 6·23 | 2·89 | 2 87 | 11·99 | 9·12 | 2·39 | 14·88 | 19 39 | " |
| 2·06 | 2·50 | 5 00 | ... | 2·00 | 10·00 | 8·00 | 3·00 | ...... | ...... | |
| 2·11 | 2·56 | 4·47 | 3·66 | 2·87 | 11·00 | 8·13 | 3·12 | 13 3 | 19 02 | Alphonse Lemoine |
| 2·50 | 3·00 | ...... | ...... | ...... | 21 00 | ...... | ...... | ...... | ...... | |
| 3·09 | 3·75 | ...... | 12·48 | 9·40 | 21·88 | 12 48 | .. | 4·95 | 23 97 | " |
| 8·51 | 10·33 | ...... | 3·71 | 3·32 | 7·03 | 3·71 | Trace. | 14·95 | 27 21 | " |
| 5·15 | 6·25 | ...... | 9·87 | 8·63 | 18·50 | 9·87 | . | 3·85 | 25 91 | " |
| ...... | ...... | ...... | ...... | ...... | 16·00 | 14·00 | .. | ...... | ...... | |
| ...... | ...... | 10·68 | 3·27 | 3·00 | 16·95 | 13·95 | .... | 12·40 | 17 32 | Miss E. Davidson. |
| ...... | 3·50 | ...... | ...... | ...... | 10·00 | 8·00 | 6·00 | ...... | ...... | |
| 3·92 | 4·76 | 7·99 | 2 09 | 1·43 | 11·51 | 10·08 | 7·06 | 15·04 | 29 92 | " |
| ...... | 2·50 | ...... | ...... | ...... | 11·00 | 9·00 | 2·06 | ...... | ...... | |
| 2·95 | 3·58 | 8·64 | 1·67 | 2·55 | 12 86 | 10·31 | 2·76 | 12·24 | 23 54 | " |
| ...... | 2·00 | ...... | ...... | ...... | 7·00 | 5·00 | 2·00 | ...... | ...... | |
| 1·79 | 2·17 | 6·07 | 0·79 | 1·60 | 8·46 | 6·86 | 2·12 | 5 04 | 15 51 | " |
| ...... | 2·00 | ...... | ...... | ...... | 11·00 | 9·00 | 1·00 | ...... | ...... | |
| 1·89 | 2·29 | 7·68 | 2·15 | 2·71 | 12·54 | 9·83 | 1·89 | 16·44 | 19 28 | " |
| ...... | 2·00 | ...... | ...... | ...... | 10·00 | 8·00 | 3·00 | ...... | ...... | |
| 2·00 | 2·43 | 5·56 | 2·12 | 2·87 | 10·55 | 7·68 | 3·08 | 10·4 | 18 24 | Alphonse Lemoine. |
| ...... | 4·00 | ...... | ...... | ...... | ...... | 20·00 | ...... | ...... | ...... | |
| 3·62 | 4·40 | Trace. | 11·64 | 11·64 | 23·28 | 11·64 | None. | 5·45 | 24 98 | " |
| ...... | 18·00 | ...... | ...... | ...... | ...... | ...... | ...... | ...... | ...... | |
| 15·40 | 18·70 | ...... | ...... | ...... | ...... | ...... | ... | ...... | 40 04 | " |
| ...... | 3·50 | ...... | ...... | ...... | 8·00 | ...... | 3·00 | ...... | ...... | |
| 3·32 | 4·03 | 3·32 | 3·72 | 4·47 | 11·51 | 7·04 | 3·14 | 14·50 | 21 34 | " |
| ...... | 2·00 | ...... | ...... | ...... | 9·00 | ...... | 6·00 | ...... | ...... | |
| 2·78 | 3·38 | 3·19 | 3·53 | 4·15 | 10·87 | 6·72 | 6·03 | 13·45 | 22 01 | " |

TABLE I.—Statement of the Results of Examining 128

| Number of Sample. | Designation. | Name of Manufacturer. | By whom sent. | From what Materials Produced. | — |
|---|---|---|---|---|---|
| 1427 | Freeman's Celery and Early Vegetable Manure. | The W. A. Freeman Co., Ltd., Hamilton. | W. A. Freeman, Hamilton, Ont. | | Guaranteed contents<br>Standard sample |
| 1428 | Freeman's Grass and Grain. | ″ | | | Guaranteed contents<br>Standard sample |
| 1429 | Freeman's Phosphate Powder. | ″ | | | Guaranteed contents<br>Standard sample |
| 1430 | Freeman's Potato Manure. | ″ | | | Guaranteed contents<br>Standard sample |
| 1431 | Freeman's Tankage Manure. | ″ | | | Guaranteed contents<br>Standard sample |
| 1432 | Freeman's Tobacco Manure. | ″ | | | Guaranteed contents<br>Standard sample |
| 1433 | Freeman's Pure Bone Meal. | ″ | | | Guaranteed contents<br>Standard sample |
| 1434 | Ingersoll Fertilizer A. | Ingersoll Packing Co., Ingersoll, Ont. | C. C. L. Wilson, manager, Ingersoll, Ont. | Blood, tankage and bone from the hog. | Guaranteed contents<br>Standard sample<br>Second sampling |
| 1435 | Fertilizer | London Soap Co., London, Ont. | Manufacturer | | Standard sample |
| 1436 | Bradley's New Method | The American Agricultural Chemical Co., Buffalo, N.Y. | Sales Department, Buffalo, N.Y. | | Guaranteed contents<br>Standard sample |
| 1437 | Bradley's B. D. Sea Fowl Guano. | ″ | | | Guaranteed contents<br>Standard sample |
| 1438 | Bradley's Complete Manure for Potatoes and Vegetables | ″ | | | Guaranteed contents<br>Standard sample |
| 1439 | Bowker's Vermont Phosphate. | Bowker Fertilizer Co., Boston, Mass. | F. Miller, advertising manager, Boston, U.S. | Bone, bone black, phosphoric guano, bone phosphates, dried blood meat or fish, sulphate of ammonia or nitrate of soda, sulphate of potash or muriate of potash and sulphuric acid. | Guaranteed contents<br>Standard sample |
| 1440 | Bowker's Sure Crop Phosphate. | ″ | | | Guaranteed contents<br>Standard sample |
| 1441 | Bowker's Potash Bone. | ″ | | | Guaranteed contents<br>Standard sample |
| 1442 | Bowker's Farm and Garden Phosphate. | ″ | | | Guaranteed contents<br>Standard sample |
| 1443 | Bowker's Corn Phosphate. | ″ | | Bone, bone black, phosphatic guano, bone phosphates, dried blood, meat or fish, sulphate of ammonia or muriate of potash and sulphuric acid. | Guaranteed contents<br>Standard sample |
| 1444 | Bowker's Bone and Potash Square Brand. | ″ | | | Guaranteed contents<br>Standard sample |
| 1445 | Bowker's Potato and Vegetable Phosphate. | ″ | | | Guaranteed contents<br>Standard sample |
| 1446 | Stockbridge Potato and Vegetable Manure. | ″ | | | Guaranteed contents<br>Standard sample |

Standard Samples of Commercial Fertilizers, &c.—*Continued.*

| Results of Analysis. | | | | | | | | | Relative Value per Ton of 2,000 lbs. | Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen. | | Phosphoric Acid. | | | | | Pot-ash. | Moist-ure. | | |
| Total including that of Nitric Acid and Ammonia. | Total Calculated as Ammonia. | Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | |
| ... | 6·00 | ... | ... | ... | 9·00 | ... | 6·00 | ... | ... | |
| 4·48 | 5·44 | 3·83 | 2·89 | 3·83 | 10·55 | 6·72 | 6·83 | 11·72 | 27·75 | Miss E. Davidson. |
| ... | 2·00 | ... | ... | ... | 9·00 | ... | 1·00 | ... | ... | |
| 2·59 | 3·14 | 2·87 | 3·37 | 3·83 | 10·07 | 6·24 | 3·47 | 10.16 | 18·67 | " |
| ... | ... | ... | ... | ... | 15·00 | ... | | ... | ... | |
| 0·36 | 0·44 | 9·91 | 4·17 | 3·99 | 18·07 | 14·08 | ... | 11·96 | 18·62 | " |
| ... | 3·00 | ... | ... | .. | 9·00 | ... | 5·00 | ... | ... | |
| 2·95 | 3·58 | 4·31 | 3·53 | 4·79 | 12·63 | 7·84 | 7·54 | 13·16 | 26·08 | " |
| ... | 5·00 | ... | ... | .. | 12·00 | ... | ... | ... | ... | |
| 6·16 | 7·48 | 0·63 | 11·68 | 3·99 | 16·30 | 12·31 | ... | 4·68 | 29·59 | " |
| ... | 6·00 | ... | ... | | 7·00 | ... | 7·00 | ... | ... | |
| 5·64 | 6·85 | 3·6 | 3·44 | 3·32 | 10·36 | 7·04 | 6·30 | 11·60 | 26·48 | Alphonse Lemoine. |
| ... | 3·00 | ... | ... | ... | 23·00 | ... | | ... | ... | |
| 3·5 | 4·25 | None... | 13·24 | 13·56 | 26·8 | 13.24 | None. | 6·90 | 27·13 | " |
| ... | 9·00 | ... | ... | ... | 6·80 | ... | ... | 8·00 | ... | |
| 7·92 | 8·40 | Trace... | 11·84 | 2·36 | 14·20 | 11·84 | 0·20 | 15·12 | 32·94 | " |
| 7·67 | 9·32 | ... | 11·99 | 2·72 | 14·71 | 11·99 | Trace. | 14·05 | 32·41 | " |
| 9·21 | 11·18 | Trace... | 1·27 | 2·23 | 3·6 | 1·27 | 0·30 | 11·75 | 26·33 | |
| 0·82 | 1·00 | ... | ... | 1·00 | 9·00 | 8·00 | 2·00 | ... | ... | |
| 1·21 | 1·47 | 5·56 | 4·04 | Trace. | 9·6 | 9·60 | 2·25 | 10·3 | 16·62 | " |
| 2·06 | 2·50 | 6·00 | ... | 1·00 | 9·00 | 8·00 | 1·50 | ... | ... | |
| 2·78 | 3·38 | 6·07 | 2·76 | 2·11 | 10·94 | 8·83 | 1·62 | 14·65 | 19·88 | " |
| 3·29 | 4·00 | 6·00 | ... | 1·00 | 9·00 | 8·00 | 7·00 | ... | ... | |
| 4·14 | 5·03 | 5·75 | 2·89 | 2·55 | 11·19 | 8·64 | 7·10 | 9·35 | 29·30 | " |
| ... | 3·00 | ... | ... | .. | 10·00 | 8·00 | 4·00 | ... | ... | |
| 2·45 | 2·98 | 5·24 | 3·72 | 1.92 | 10·87 | 8·96 | 4·50 | 13·00 | 21·99 | " |
| ... | 1·00 | ... | ... | .. | 11·00 | 9·00 | 2·00 | ... | ... | |
| 1·48 | 1·8 | 5·75 | 3·72 | 1·72 | 11·19 | 9·47 | 4·09 | 9·36 | 19·66 | " |
| ... | 1·00 | ... | ... | ... | 8·00 | 6·00 | 2·00 | ... | ... | |
| 1·23 | 1·49 | 2·11 | 4·61 | 1·72 | 8·44 | 6·72 | 2·35 | 7·85 | 13·53 | " |
| ... | 2·00 | ... | ... | ... | 10·00 | 8·00 | 2·00 | ... | ... | |
| 1·90 | 2·31 | 5·76 | 3·68 | 1·59 | 11·03 | 9·44 | 2·10 | 10·48 | 18·58 | Miss E. Davidson. |
| ... | 2·00 | ... | ... | .. | 10·00 | 8·00 | 2·00 | ... | ... | |
| 1·60 | 1·94 | 5·76 | 3·35 | 1·44 | 10·55 | 9·11 | 2·00 | 11·64 | 17·28 | " |
| ... | 2·00 | ... | ... | .. | 10·00 | 6·00 | 2·00 | ... | ... | |
| 1·62 | 1·97 | 3·00 | 5·13 | 4·79 | 12·92 | 8·13 | 2·37 | 6·72 | 17·06 | " |
| ... | 2·00 | ... | ... | ... | 11·00 | 9·00 | 2·00 | ... | ... | |
| 1·95 | 2·36 | 7·56 | 2·67 | 1·28 | 11·51 | 10·23 | 2·88 | 3·52 | 20·48 | " |
| ... | 4·00 | ... | ... | ... | 7·00 | 6·00 | 10·00 | ... | ... | |
| 3·32 | 4·03 | 5·12 | 2·40 | 1·59 | 9·11 | 7·52 | 11·43 | 9·16 | 29·89 | " |

## Table I.—Statement of the Results of Examining 128 Standard Samples

| Number of Samples. | Designation. | Name of Manufacturer. | By whom sent. | From what Materials Produced. | — |
|---|---|---|---|---|---|
| 1447 | New England Corn Phosphate. | The New England Fertilizer Co., Boston, Mass. | A.P. Clarke, agent, Boston, Mass. | Blood, meat, bone, bone black, bone phosphates, nitrates of soda or sulphates of ammonia and sulphate or nitrate of potash. | Guaranteed contents<br>Standard sample.... |
| 1448 | New England Potato Fertilizer. | " .. | " .. | | Guaranteed contents<br>Standard sample.... |
| 1449 | New England Seeding down Fertilizer | " .. | " : | | Guaranteed contents<br>Standard sample.... |
| 1450 | Swift's Lowell Bone Fertilizer. | Lowell Fertilizer Co., Boston, Mass. | Benjamin Moody, agent. | Blood, meat, bone, bone black, bone phosphates, nitrate of soda, or sulphate of ammonia and sulphate or nitrate of potash. | Guaranteed contents<br>Standard sample.... |
| 1451 | Swift's Lowell Potato Manure. | " .. | ............... | | Guaranteed contents<br>Standard sample.... |
| 1452 | Swift's Lowell Potato Phosphate. | " .. | ............... | | Guaranteed contents<br>Standard sample.... |
| 1453 | Swift's Lowell Animal Brand. | " .. | ............... | | Guaranteed contents<br>Standard sample.... |
| 1454 | Swift's Lowell Ground Bone. | " .. | ............... | ............... | Guaranteed contents<br>Standard sample.... |
| 1455 | Packer's Union Potato Manure. | The American Agricultural Chemical Co., Rutland, Vt. | Packers Union Fertilizer Branch, Rutland, Vt. | ............... | Guaranteed contents<br>Standard sample.... |
| 1456 | Packer's Union Wheat, Oats and Clover Fertilizer. | " .. | " .. | ............... | Guaranteed contents<br>Standard sample.... |
| 1457 | Packer's Union Economical Vegetable Guano. | " .. | " . | ............... | Guaranteed contents<br>Standard sample. .. |
| 1458 | Palmerston Tankage | Palmerston Pork Packing Co. | ............... | Bone, blood and general packing house refuse. | Standard sample.... |
| 1459 | Bone Meal...... ... | Darch & Hunter, London, Ont. | ............... | ............... | Standard sample.... |
| 1460 | Alberts' Concentrated Soluble Horticultural Manure Brand A.G. | Chemical Works, late H. & E. Albert, Biebrich on Rhine. | F.W. Wedderburn, St. John, N.B. | ............... | Guaranteed contents<br>Standard sample ... |
| 1461 | Potato Phosphate... | Nova Scotia Fertilizer Co., Halifax, N.S. | C. M. Jack, Halifax, N.S. | Bone char, bone, dried blood, tankage, bone phosphates, sulphate of ammonia, nitrate of soda, high grade muriate of potash or sulphate of potash, and sulphuric acid. | Guaranteed contents<br>Standard sample.... |
| 1462 | Ceres Superphosphate. | " " .. | " " .. | ............... | Guaranteed contents<br>Standard sample.... |
| 1463 | Bone Meal ......... | " " .. | " " .. | ............... | Guaranteed contents<br>Standard sample.... |
| 1464 | Strawberry Phosphate. | " " .. | " " .. | ............... | Guaranteed contents<br>Standard sample ... |
| 1465 | Apple Tree Phosphate. | .. | " " .. | ............... | Guaranteed contents<br>Standard sample.... |

of Commercial Fertilizers, registered for 1903—*Continued.*

RESULTS OF ANALYSIS.

| Nitrogen. | | Phosphoric Acid. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total including that of Nitric Acid or Ammonia. | Total calculated as Ammonia. | Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | Potash. | Moisture. | Relative value per ton of 2,000 lbs | Name of Analyst and Remarks. |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts, | |
| .... | 2·00 | .... | .... | .... | 9·00 | 8·00 | 3·00 | .... | .... | |
| 1·98 | 2·40 | 5·11 | 3·65 | 1·28 | 10·04 | 8·76 | 3·48 | 9·7 | 19·32 | Alphonse Lemoine. |
| .... | 2·00 | .... | .... | | 8·00 | 7·00 | 4·00 | .... | .... | |
| 1·94 | 2·38 | 5·11 | 3·08 | 1·08 | 9·27 | 8·19 | 4·51 | 7·6 | 19·62 | |
| .... | 1·50 | .... | .... | . | 8·00 | 7·00 | 2·00 | .... | .... | |
| 1·73 | 2·09 | 4·60 | 3·97 | 0·70 | 9·27 | 8·57 | 2·27 | 9·15 | 16·98 | |
| .... | 2·00 | .... | .... | .. | 9·00 | 8·00 | 3·00 | .... | .... | |
| 1·84 | 2·23 | 5·43 | 3·85 | 1·08 | 10·36 | 9·28 | 3·35 | 10·15 | 19·00 | .. |
| .... | 2·00 | .... | .... | .... | 8·00 | 7·00 | 4·00 | .... | .... | |
| 1·87 | 2·26 | 5·43 | 2·43 | 0·9 | 8·76 | 7·86 | 4·65 | 7·1 | 19·20 | |
| .... | 3·00 | .... | .... | .... | 9·00 | 8·00 | 6·00 | .... | .... | |
| 2·88 | 3·50 | 7·83 | 2·41 | 1·59 | 11·83 | 10.24 | 5·85 | 7·84 | 26·16 | Miss E. Davidson. |
| .... | 3·00 | .... | .... | .... | 10·00 | 9·00 | 4·00 | .... | .... | |
| 2·78 | 3·38 | 7·99 | 2·88 | 0·80 | 11·67 | 10·87 | 3·99 | 9·72 | 24·42 | .. |
| .... | 3· | .... | .... | .... | 23·00 | .... | .... | .... | .... | |
| 2·99 | 3·63 | .... | 14·23 | 12·95 | 27·18 | 14·23 | .... | 6·28 | 26·71 | .. |
| 2·06 | 2·50 | 5·00 | .... | 1·00 | 10·00 | 8·00 | 6·00 | .... | .... | |
| 2·23 | 2·70 | 5·43 | 5·29 | 1·91 | 12·63 | 10·72 | 6·47 | 10·68 | 25·50 | .. |
| .... | .... | 6·00 | .... | 1·00 | 12·00 | 11·00 | 2·00 | .... | .... | |
| Trace. | Trace. | 7·99 | 3·37 | 2·39 | 13·75 | 11·36 | 2·24 | 11·00 | 16·37 | .. |
| 1·25 | 1·50 | 4·50 | .... | 1·00 | 7·00 | 6·00 | 3·00 | .... | .... | |
| 2·25 | 2·73 | 4·60 | 4·23 | 5·88 | 14·71 | 8·83 | 3·25 | 13·2 | 21·19 | Alphonse Lemoine. |
| 6·37 | 7·73 | Trace. | 9·15 | 2·36 | 11·51 | 9·15 | 1·81 | 13·40 | 27·96 | Alphonse Lemoine. |
| 2·28 | 2·77 | Trace. | 12·85 | 15·35 | 28·2 | 12·85 | . | 3·50 | 24·20 | .. |
| 12·62 | .... | 11·01 | .... | .... | .... | .... | 19·10 | .... | .... | |
| 12·82 | 15·56 | 9·91 | 2·05 | .... | 11·96 | 11·96 | 18·90 | 1·85 | 67·31 | |
| .... | 3·71 | .... | .... | . | 7·82 | .... | 4·70 | .... | .... | |
| 3·30 | 4·01 | 4·92 | 0·84 | 1·91 | 7·67 | 5·76 | 3·71 | 9·30 | 19·21 | .. |
| .... | 2·00 | .... | .... | .... | 9·16 | .... | .... | 2·14 | .... | |
| 2·63 | 3·19 | 6·07 | 1·77 | 1·91 | 9·75 | 7·84 | 5·12 | 7·37 | 22·02 | Miss S. E. Wright. |
| .... | 3·00 | .... | .... | .... | 22·90 | .... | .... | .... | .... | |
| 2·98 | 3·62 | Trace. | 15·66 | 10·39 | 26·05 | 15·66 | .... | 8·75 | 27·50 | |
| .... | 2·02 | .... | .... | . | 8·25 | .... | 6·50 | .... | .... | |
| 2·23 | 2·70 | 3·83 | 3·84 | 2·72 | 10·39 | 7·67 | 6·45 | 6·15 | 22·21 | .. |
| .... | 3·25 | .... | .... | .. | 7·82 | .... | 6·52 | .... | .... | |
| 2·65 | 3·11 | 4·15 | 1·92 | 3·04 | 9·11 | 6·07 | 7·13 | 6·85 | 22·38 | .. |

TABLE I.—Statement of the Results of Examining 128 Standard Samples

| Number of Sample. | Designation. | Name of Manufacturer | By whom sent. | From what Materials Produced. | —— |
|---|---|---|---|---|---|
| 1466 | Ground Bone........ | The Dominion Packing Co. | W. D. Haddlesey, Charlottetown, P.E.I. | ................ | Standard sample . . |
| 1467 | Dried Blood....... | ″ ″ .. | ″ ″ . | .. .......... .... | Standard sample ... |
| 1468 | Tankage... ....... | ″ ″ .. | ″ ″ .. | Blood, bone, and tankage or the offal from animals. | ″ ... |
| 1469 | Mixed Fertilizer.... | ″ ″ .. | ″ ″ .. | Blood, bone tankage, muriate of potash and nitrate of soda. | ″ .... |
| 470 | Fertilizer, Bone Meal | ............ ... . | Illsley & Harvey, Port William, N.S. | ..... ... .... ... | ″ ... |
| 1471 | Homestead, a Bone Black Fertilizer. | Michigan Carbon, Co. Detroit, Mich. | Wm. H. Burtenshaw, Sec. Tres'r, Detroit. | ... .. ........ . | Guaranteed contents<br>Standard sample.... |
| 1472 | Homestead Potato and Tobacco Fertilizer. | ″ ″ .. | ″ ″ .. | ............... . | Guaranteed contents<br>Standard sample.... |
| 1473 | Pure Animal Bone and Potash. | ″ ″ .. | ″ ″ .. | .... ....... .. . | Guaranteed contents<br>Standard sample.... |
| 1474 | Dessicated Bone.... | ″ ″ .. | ″ ″ .. | ................. | Guaranteed contents<br>Standard sample ... |
| 1475 | Market Garden and Potato Fertilizer. | Russia Cement Co.. Gloucester, Mass. | S. C. Shaffner, Granville Ferry, N.S. | . ... ... ... | Guaranteed contents<br>Standard sample.... |
| 1476 | Muriate of Potash... | Victoria Chemical Co., Ltd., Victoria, B.C. | John A. Hall, Treasurer, Victoria, B.C. | .... .. .... .... | Guaranteed contents<br>Standard sample.... |
| 1477 | Kainite.. ...... ... | ″ ″ .. | ″ ″ .. | .... ...... .. ... | Guaranteed contents<br>Standard sample.... |
| 1478 | Sulphate of Potash .. | ″ ″ .. | ″ ″ .. | ..... . . . ... | Guaranteed contents<br>Standard sample.... |
| 1479 | Thomas' Phosphate Powder. | ″ ″ .. | ″ ″ .. | .. ......... .. | Guaranteed contents<br>Standard sample.... |
| 1480 | Nitrate of Soda. .. . | ″ ″ .. | ″ ″ .. | .... ........ .. | Guaranteed contents<br>Standard sample.... |
| 1481 | Superphosphate of Lime. | ″ ″ .. | ″ ″ .. | Spent bone char and sulphuric acid. | Guaranteed contents<br>Standard sample.... |
| 1482 | Fertilizer A ... .... | ″ ″ .. | ″ ″ | Nitrate of soda. muriate of potash and superphosphate of lime. | Guaranteed contents<br>Standard sample.... |
| 1483 | ″ B ........ | ″ ″ .. | ″ ″ .. | ″ ″ .. | Guaranteed contents<br>Standard sample.... |
| 1484 | ″ C ... ... | ″ ″ .. | ″ ″ .. | Muriate of potash and superphosphate of lime. | Guaranteed contents<br>Standard sample.... |
| 1485 | Offal. . ......... | Black & Shortreed, Fergus, Ont. | Manufacturers... | Bone, sinew and offal of beef animals only. | Standard sample. . |
| 1486 | Dried Blood........ | ″ ″ .. | ″ .... | ......... ....... | Standard sample.. . |

Samples of Commercial Fertilizers, &c.—*Continued.*

RESULTS OF ANALYSIS.

| Nitrogen. | | Phosphoric Acid. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total including that of Nitric Acid or Ammonia. | Total calculated as Ammonia. | Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | Potash. | Moisture. | Relative value per ton of 2,000 lbs. | Name of Analyst and Remarks. |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | |
| 4·17 | 5·07 | .... | 13·43 | 7·35 | 20·78 | 13·43 | .... | 8·00 | 26 98 | Miss E. Davidson |
| 9·66 | 11·73 | 0·64 | 1·61 | 0·31 | 2·56 | 2·25 | 2·23 | 29·96 | 28 52 | " |
| 5·32 | 6·46 | 0·63 | 12·16 | 6·71 | 19·50 | 12·79 | 2·33 | 7·20 | 31 37 | " |
| 4·98 | 6·05 | 0·95 | 9·77 | 4·15 | 14·87 | 10·72 | 7·78 | 6·48 | 33 25 | " |
| 4·15 | 5·05 | Trace. | 6·07 | 20·31 | 26·38 | 6·07 | 1·98 | 7·52 | 24 78 | " |
| 2·06 | 2·50 | .... | .... | .... | 9·00 | 8·00 | 1·50 | .... | .... | |
| 1·98 | 2·41 | 7·35 | 0·65 | 1·91 | 9·91 | 8·00 | 1·97 | 12·05 | 16 93 | Alphonse Lemoine. |
| 2·66 | 2·50 | .... | .... | .... | 9·00 | 8·00 | 3·00 | .... | .... | |
| 2·03 | 2·46 | 7·35 | 0·51 | 1·28 | 9·14 | 7·86 | 3·31 | 11·90 | 18 49 | " |
| 0·82 | 1·00 | .... | .... | .... | 22·00 | .... | 6·00 | .... | .... | " |
| 0·88 | 1·07 | None. | 16·63 | 14·52 | 31·15 | 16·63 | 5·95 | 1·80 | 31 00 | |
| .... | 1·50 | .... | .... | | 25·00 | .... | .... | .... | .... | " |
| 1·27 | 1·54 | None. | 17·01 | 15·99 | 33·00 | 17·01 | Trace. | 2·75 | 26 56 | |
| 2·00 | 2·40 | 4·00 | .... | 2·00 | 10·00 | 8·00 | 5·00 | .... | .... | |
| 2·09 | 2·53 | 3·83 | 7·69 | 3·51 | 15·03 | 11·52 | 6·37 | 10·5 | 26 23 | " |
| .... | .... | .... | .... | .... | .... | .... | 53·00 | .... | .... | |
| .... | .... | .... | .... | .... | .... | .... | 55·58 | 0·12 | 58 36 | Miss E. Davidson. |
| .... | .... | .... | .... | .... | .... | .... | 12·00 | .... | .... | |
| .... | .... | .... | .... | .... | .... | .... | 13·93 | 10·08 | 14 63 | " |
| .... | .... | .... | .... | .... | .... | .... | 53·00 | .... | .... | |
| .... | .... | .... | .... | .... | .... | .... | 53·46 | 6·00 | 56 13 | " |
| .... | .... | .... | .... | .... | 15·00 | .... | .... | .... | .... | |
| .... | .... | .... | 12·47 | 4·31 | 16·78 | 12·47 | .... | 0·04 | 16 74 | " |
| 16·00 | .... | .... | .... | .... | .... | .... | .... | .... | .... | |
| 15·93 | 19·35 | .... | .... | .... | .... | .... | .... | 0·65 | 41 42 | Alphonse Lemoine |
| .... | .... | .... | .... | .... | 16·00 | .... | | .... | .... | |
| Trace. | Trace. | 16·12 | 2·56 | 0·64 | 19·32 | 18·68 | .... | 12·70 | 22 35 | " |
| 4·00 | .... | .... | .... | .... | 10·00 | .... | 7·00 | .... | .... | |
| 3·46 | 4·20 | 10·55 | 0·96 | 0·64 | 12·15 | 11·51 | 7·51 | 10·07 | 30 79 | " |
| 3·50 | .... | .... | .... | .... | 9·00 | .... | 11·00 | .... | .... | |
| 2·79 | 3·38 | 10·23 | 1·60 | .... | 11·83 | 11·83 | 12·03 | 9·40 | 33 92 | " |
| .... | .... | .... | .... | .... | 12·50 | .... | 11·00 | .... | .... | |
| .... | .... | 14·52 | 1·47 | .... | 15·99 | 15·99 | 11·56 | 9·10 | 31 16 | " |
| 6·56 | 7·98 | 1·28 | 6·94 | 5·08 | 13·30 | 8·22 | 0·75 | 6·40 | 27 23 | " |
| 10·10 | 12·27 | 1·28 | 0·38 | 0·70 | 2·36 | 1·66 | 0·61 | 20·35 | 27 54 | " |

TABLE I.—Statement of the Results of examining 128 Standard

| Number of Sample. | Designation. | Name of Manufacturer. | By whom sent. | From what Materials Produced. | — |
|---|---|---|---|---|---|
| 1487 | Eureka Potato Manure. | Pidgeon Fertilizer Co., Ltd., Windsor, N.S. | Robert Pidgeon, Manager. | ................. | Standard sample ... |
| 1488 | Eureka Phosphate .. | " " .. | " " .. | ................. | Standard sample.. . |
| 1489 | Intense Brand.... . | " " .. | " " .. | . .......... | Standard sample.... |
| 1490 | Ground Bone........ | " " .. | " " .. | ................. | Standard sample.... |

Samples of Commercial Fertilizers, registered for 1903—*Concluded.*

| Results of Analysis. | | | | | | | | | Relative value per ton of 2,000 lbs | Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen. | | Phosphoric Acid. | | | | | Pot-ash. | Moist-ure. | | |
| Total including that of Nitric Acid and Ammonia. | Total calculated as Ammonia. | Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total available. | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | |
| 3·07 | 3·73 | 1·91 | 0·97 | 8·12 | 11·00 | 2·88 | 5·05 | 9·10 | 19 08 | Alphonse Lemoine; under standard required by the Act and therefore not legally saleable. |
| 2·87 | 3·48 | 0·48 | 2·40 | 9·27 | 12·15 | 2·88 | 2·35 | 11·60 | 15 93 | Miss E. Davidson; under standard required by the Act and therefore not legally saleable. |
| 2·27 | 2·75 | 0·64 | 0·96 | 8·31 | 9·91 | 1·60 | 5·31 | 12·28 | 15 79 | " " |
| 2·37 | 2·87 | ....... | 16·31 | 7·03 | 23·34 | 16·31 | .. | 6·88 | 25 74 | Miss E. Davidson. |

TABLE II.—Results of the Examination of 84

| Date of Collection. | No. of Sample. | Name and Address of | | Name or Brand of Fertilizer. | Nitrogen. | |
|---|---|---|---|---|---|---|
| | | Vendor. | Manufacturer or Furnisher as given by Vendor. | | Total including that of Nitric Acid or Ammonia if present. | Total, calculated as Ammonia. |
| 1903. | | | | | p. c. | p. c. |
| April 16 | 20235 | L. B. Wyman, Yarmouth, N.S. | Swift Fertilizer Co., Lowell, Mass. | Potato Phosphate— | | |
| | | | | As guaranteed | ........ | 3·06 |
| | | | | Standard sample (1452) | 2·88 | 3·50 |
| | | | | Sample as sold | 2·75 | 3·34 |
| " 18 | 20242 | W. M. Carruthers, Kentville, N.S. | Russia Cement Co., Gloucester, U.S. | Corn, Grain and Grass Brand— | | |
| | | | | As guaranteed | ........ | 4·00 |
| | | | | Standard sample (1368) | 2·58 | 3·13 |
| | | | | Sample as sold | 3·71 | 4·50 |
| " 18 | 20243 | " | " " | Potatoes, Roots and Vegetable Fertilizer— | | |
| | | | | As guaranteed | ....... | 4·50 |
| | | | | Standard sample (1369) | 3·29 | 4·00 |
| | | | | Sample as sold | 4·09 | 4·96 |
| " 18 | 20244 | Wolfville Coal Co., Wolfville, N.S. | Bowker & Co., Boston, Mass. | Stockbridge Brand— | | |
| | | | | As guaranteed | ....... | 4·00 |
| | | | | Standard sample (1446) | 3·32 | 4·03 |
| | | | | Sample as sold | 3·51 | 4·27 |
| " 18 | 20245 | " | " " | Potato Phosphate— | | |
| | | | | As guaranteed | ....... | 2·00 |
| | | | | Standard sample (1445) | 1·95 | 2·36 |
| | | | | Sample as sold | 2·00 | 2·43 |
| " 18 | 20247 | Illsley and Harvey, Wolfville, N.S. | Vendors | Calcutta Bone— | | |
| | | | | As guaranteed | ........ | ........ |
| | | | | Standard sample (1470) | 4·15 | 5·05 |
| | | | | Sample as sold | 3·89 | 4·73 |
| " 18 | 20261 | F. W. Dimock, Windsor, N.S. | Nova Scotia Fert. Co., Halifax. | Ground Bone— | | |
| | | | | As guaranteed | ....... | 3·00 |
| | | | | Standard sample (1463) | 2·98 | 3·62 |
| | | | | Sample as sold | 2·98 | 3·62 |
| " 22 | 20303 | J. H. Kent, Truro, N.S. | Bowker & Co., Boston, Mass. | Fresh Ground Bone— | | |
| | | | | As guarantred | ........ | ........ |
| | | | | Standard sample | ........ | ...... |
| | | | | Sample as sold | 3·15 | 3·82 |
| " 30 | 20324 | Wm. McV. Smith, Dartmouth, N.S. | Hattie & Mylins, Halifax (Provincial Chemical Fertilizer Co., St. John, N.B.) | Imperial Superphosphate— | | |
| | | | | As guaranteed | ....... | 3·00 |
| | | | | Standard sample (1376) | 3·03 | 3·68 |
| | | | | Sample as sold | 1·66 | 2·02 |
| " 30 | 20327 | E. M. Walker, Dartmouth, N.S. | American Agricultural Chemical Co., Boston. | Potato Special Fertilizer— | | |
| | | | | As guaranteed | 2·06 | 2·50 |
| | | | | Standard sample (1398) | 2·38 | 2·89 |
| | | | | Sample as sold | 1·79 | 2·17 |
| " 20 | 4325 | R. I. Holman, Summerside, P.E.I. | Wallace & Frazer, St. John, N.B. | Alberts Thomas Phosphate Powder— | | |
| | | | | As guaranteed | ........ | ........ |
| | | | | Standard sample (1396) | ........ | ...... |
| | | | | Sample as sold | ........ | ....... |
| " 23 | 4343 | R. E. Mutch, Charlottetown. | Nova Scotia Fertilizer Co., Halifax, N.S. | Potato Phosphate— | | |
| | | | | As guaranteed on label | ........ | 3·71 |
| | | | | Standard sample (1461) | 3·30 | 4·01 |
| | | | | Sample as sold | 0·98 | 1·19 |
| " 23 | 4344 | A. Gill, Charlottetown, P.E.I. | Bowker Fertilizer Co., Boston, Mass. | Potato and Vegetable Phosphate— | | |
| | | | | As guaranteed on label | ........ | 2·00 |
| | | | | Standard sample (1445) | 1·95 | 2·36 |
| | | | | Sample as sold | 1·87 | 2·27 |

Samples of Fertilizers as sold in 1903.

| Results of Analysis. | | | | | | | | No. of Sample. | *Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| Phosphoric Acid. | | | | | Potash | Moisture. | Relative value per ton of 2,000 lbs | | |
| Soluble in Water. | Citric soluble. | Insoluble. | Total. | Total Available. | | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | | |
| ........ | ........ | ........ | 9·00 | 8·00 | 6·00 | ........ | ........ | 20235 | |
| 7·83 | 2·41 | 1·59 | 11·83 | 10·24 | 5·85 | 7·84 | 26 16 | | |
| 6·84 | 2·26 | 1·40 | 10·50 | 9·10 | 8·18 | 7·15 | 26 86 | | Mr. A. Lemoine ; genuine |
| 3·00 | ....... | 2·50 | 9·50 | 7·00 | 9·50 | ........ | ........ | 20242 | |
| 6·72 | 2·40 | 2·23 | 11·35 | 9·12 | 10·50 | 3·60 | 35 17 | | |
| 3·50 | 5·70 | 1·40 | 10·60 | 9·20 | 11·12 | 9·55 | 32 22 | | " " |
| 3·00 | ....... | 2·00 | 9·00 | 7·00 | 9·00 | ........ | ........ | 20243 | |
| 7·03 | 3·05 | 3·99 | 14·07 | 10·05 | 8·82 | 6·84 | 30 78 | | |
| 5·60 | 3·84 | 3·19 | 12·63 | 9·44 | 8·54 | 5·88 | 31 50 | | Miss E. Davidson " |
| ........ | ........ | ........ | 7·00 | 6·00 | 10·00 | ........ | ........ | 20244 | |
| 5·12 | 2·40 | 1·59 | 9·11 | 7·52 | 11·43 | 9·16 | 29 89 | | |
| 3·36 | 3·52 | 1·92 | 8·80 | 6·88 | 10·47 | 11·76 | 28 60 | | " " |
| ........ | ........ | ........ | 11·00 | 9·00 | 2·00 | ........ | ........ | 20245 | |
| 7·56 | 2·67 | 1·28 | 11·51 | 10·23 | 2·88 | 3·52 | 20 48 | | |
| 5·12 | 4·00 | 2·87 | 11·99 | 9·12 | 2·62 | 11·36 | 19 35 | | " " |
| ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | 20247 | |
| Trace. | 6·07 | 20·31 | 26·38 | 6·07 | 1·98 | 7·52 | 24 78 | | |
| ........ | 14·39 | 11·19 | 25·58 | 14·39 | ........ | 10·84 | 28 53 | | " " |
| ........ | ........ | ........ | 22·90 | ........ | ........ | ........ | ........ | 20261 | |
| Trace. | 15·66 | 10·39 | 26·05 | 15·66 | ........ | 8·75 | 27 50 | | |
| ........ | 16·45 | 9·91 | 26·36 | 16·45 | ........ | 6·60 | 28 21 | | Miss S. E. Wright ; genuine |
| Not registered. | | | | | | | | | |
| ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | 20303 | |
| ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | | |
| ........ | 13·76 | 6·23 | 19·99 | 13·76 | ........ | 2·20 | 24 57 | | " |
| ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | 20324 | |
| 7·35 | 2·73 | 7·67 | 17·75 | 10·08 | 1·35 | 11·65 | 23 41 | | |
| 4·63 | 4·16 | 7·68 | 16·47 | 8·79 | 3·67 | 12·05 | 20 61 | | " deficient in ammonia. |
| 5·00 | ........ | 2·00 | 10·00 | 8·00 | 3·00 | ........ | ........ | 20327 | |
| 7·52 | 2·24 | 2·71 | 12·47 | 9·76 | 3·44 | 13·92 | 22 08 | | |
| 7·83 | 2·40 | 3·20 | 13·43 | 10·23 | 6·97 | 10·85 | 24 97 | | Miss S. E. Wright ; genuine. |
| ........ | ........ | ........ | ........ | ........ | ........ | ........ | ........ | 4325 | |
| ........ | 14·55 | 4·00 | 18·55 | 14·55 | ........ | ........ | 18 89 | | |
| ........ | 13·60 | 6·23 | 19·83 | 13·60 | ........ | Trace. | 19 32 | | " " |
| ........ | ........ | ........ | 7·82 | ........ | 4·70 | ........ | ........ | 4343 | |
| 4·92 | 0·84 | 1·91 | 7·67 | 5·76 | 3·71 | 9·30 | 19 21 | | |
| 1·59 | 4·17 | 1·72 | 7·48 | 5·76 | 2·51 | 15·35 | 12 21 | | Alph. Lemoine ; deficient in ammonia. |
| ........ | ........ | ........ | 11·00 | 9·00 | 2·00 | ........ | ........ | 4344 | |
| 7·56 | 2·67 | 1·28 | 11·51 | 10·23 | 2·88 | 3·52 | 20 48 | | |
| 3·64 | 5·42 | 2·04 | 11·00 | 8·96 | 2·45 | 16·75 | 18 26 | | Alph. Lemoine ; genuine. |

TABLE II.—Results of the Examination of 84

| Date of Collection. | No. of Sample. | Name and Address of | | Name or Brand of Fertilizer. | Nitrogen. | |
|---|---|---|---|---|---|---|
| | | Vendor. | Manufacturer or Furnisher as given by Vendor. | | Total including that of Nitric Acid or Ammonia if present. | Total calculated as Ammonia. |
| 1903. | | | | | p. c. | p. c. |
| April 23 | 4345 | A. Horne, Charlottetown, P.E.I. | Lowell Fertilizer Co., Boston, Mass. | Swift's Lowell Animal Fertilizer— | | |
| | | | | As guaranteed on label ... | .. ... | 3·00 |
| | | | | Standard sample (1453) ... | 2·78 | 3·38 |
| | | | | Sample as sold .......... | 2·35 | 2·85 |
| " 23 | 4346 | Dominion Packing Co., Charlottetown, P.E.I. | Dominion Packing Co., Charlottetown, P.E.I. | Blood Fertilizer— | | |
| | | | | As guaranteed ....... .. | ...... | ..... .. |
| | | | | Standard sample (1467) ... | 9·66 | 11·73 |
| | | | | Sample as sold ..... .... | 8·90 | 10·81 |
| " 11 | 17855 | Thomas Reid, Parish of Simonds, St. John Co., N.B. | Vendor ........... | Superphosphate— | | |
| | | | | As guaranteed .......... | ........ | ........ |
| | | | | Standard sample (1389) ... | 3·44 | 4·18 |
| | | | | Sample as sold ..... .... | 4·11 | 4·99 |
| " 13 | 17863 | P. Nase & Son, Main St., St. John, N.B. | Swift, Lowell Fert. Co., Lowell, Mass. | Swift's Lowell Bone Fertilizer for Corn and Grain— | | |
| | | | | As guaranteed ........ | ...... | 2·00 |
| | | | | Standard sample (1450) ... | 1·84 | 2·23 |
| | | | | Sample as sold . . . . . . .. | 3·09 | 3·75 |
| " 14 | 17868 | Provincial Chem. Fert. Co., Ltd., 89 Water St., St. John, N.B. | Vendors.......... | Potato Phosphate— | | |
| | | | | As guaranteed ..... ... | ........ | 3·75 |
| | | | | Standard sample (1375) ... | 3·19 | 3·87 |
| | | | | Sample as sold ......... | 3·93 | 4·77 |
| " 14 | 17869 | James Collins, 210 Union St., St. John. | E. Frank Coe, New York. | "Prize Brand"— | | |
| | | | | As guaranteed . ........ | ..... .. | ........ |
| | | | | Standard sample .... .... | .... ... | ........ |
| | | | | Sample as sold .......... | 0·84 | 1·02 |
| " 16 | 17876 | W. B. McKay & Co., Main St., Sussex, N.B. | Bowker Fert. Co., Boston. | "Farm and Garden"— | | |
| | | | | As guaranteed .. ....... | ...... | 2·00 |
| | | | | Standard sample (1442) ... | 1·90 | 2·31 |
| | | | | Sample as sold .......... | 1·68 | 2·04 |
| " 17 | 17891 | Toombs & Son, Main St., Moncton, N.B. | American Agricultural Chemical Co., Boston, Mass. | Soluble Pacific Guano— | | |
| | | | | As guaranteed . .. .. | 2·06 | 2·50 |
| | | | | Standard sample (1401).... | 1·85 | 2·24 |
| | | | | Sample as sold.......... | 2·39 | 2·91 |
| " 22 | 17901 | Hugh McKenna, King St., St. Stephen, N.B. | Parmenter & Polsey Fertilizer Co., Peabody, Mass. | Star Brand Superphosphate— | | |
| | | | | As guaranteed .......... | ........ | ........ |
| | | | | Standard sample .... .... | ... .... | .. .... . |
| | | | | Sample as sold . ... . ... | 1·39 | 1·68 |
| " 22 | 17903 | Henry E. Hill, King St., St. Stephen. | American Agricultural Chemical Co., New York. | Bradley's XL— | | |
| | | | | As guaranteed . ... .... | 2·06 | 2·50 |
| | | | | Standard sample (1404)... | 2·00 | 2·43 |
| | | | | Sample as sold ...... . . | 1·58 | 1·92 |
| " 23 | 17909 | Small & Fisher Co., 131 Main St., Woodstock, N.B. | Provincial Chemical Fertilizer Co., St. John, N.B. | Imperial— | | |
| | | | | As guaranteed .......... | ...... .. | 3·00 |
| | | | | Standard sample (1376) ... | 3·03 | 3·68 |
| | | | | Sample as sold.. . ..... | 1·69 | 2·06 |
| " 25 | 17918 | L. E. Cooper, Fredericton, N.B. | American Agricultural Chemical Co., New York. | Great Eastern, Hay and Oats— | | |
| | | | | As guaranteed .. ... .... | .... .. | ... ... |
| | | | | Standard sample (1363) ... | 0·77 | 0·93 |
| | | | | Sample as sold........... | 0·46 | 0·56 |
| " 20 | 23349 | O. Fournier, St. Alexandre, Iberville. | Bowker Fert. Co., Boston. | Corn Phosphate— | | |
| | | | | As guaranteed .......... | ....... | 2·00 |
| | | | | Standard sample (1443) ... | 1·60 | 1·94 |
| | | | | Sample as sold.. ... .... | 1·75 | 2·12 |

Samples of Fertilizers as sold in 1903—*Continued.*

| Results of Analysis. | | | | | | | Relative value per ton of 2,000 lbs. | No. of Sample. | Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| Phosphoric Acid. | | | | | | | | | |
| Soluble in Water. | Citric Soluble. | In-soluble. | Total. | Total Available. | Potash. | Moisture. | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | | |
| ........ | ..... | 1·00 | 10·00 | 9·00 | 4 00 | ........ | ........ | 4345 | |
| 7·99 | 2·88 | 0·80 | 11·67 | 10·87 | 3·99 | 9·72 | 24 42 | | |
| 6·52 | 4·81 | 1·91 | 13·24 | 11 33 | 3·84 | 10·20 | 23 82 | | Alph. Lemoine ; genuine. |
| ..... | ....... | ..... | ....... | ....... | ....... | ....... | ....... | 4346 | |
| 0·64 | 1·61 | 0·31 | 2·56 | 2·25 | 2·23 | 29·96 | 28 52 | | |
| Trace. | 1·59 | ...... | 1·59 | 1·59 | 0·77 | 37·35 | 23 92 | | " " |
| ....... | ..... | ...... | ....... | ..... | ...... | ....... | ....... | 17855 | |
| 4·48 | 2·56 | 5·59 | 12·63 | 7·04 | 3·12 | 19 08 | 22 06 | | |
| 2·39 | 4·33 | 4·79 | 11·51 | 6·72 | 3·04 | 21·60 | 22 92 | | Miss E. Davidson ; genuine |
| ...... | ....... | ...... | 9·00 | 8·00 | 3·00 | ....... | ....... | 17863 | |
| 5·43 | 3·85 | 1·08 | 10·36 | 9·28 | 3·35 | 10·15 | 19 00 | | |
| 7·19 | 2·24 | 1·28 | 10·71 | 9·43 | 2·47 | 12·80 | 21 48 | | " " |
| ....... | ..... | ....... | 8 00 | 6·50 | .... | ....... | ..... | 17868 | |
| 6·71 | 1·63 | 4·77 | 13·11 | 8·34 | 5·23 | 10 00 | 25 05 | | |
| 7·83 | 1·77 | 3·83 | 13·43 | 9·60 | 5·07 | 7·76 | 28 04 | | " " |
| | | Not registered under this name. | | | | | | | |
| ....... | ...... | ....... | ....... | ....... | ...... | ....... | ....... | 17869 | |
| 8·15 | 2·09 | 4·15 | 14·39 | 10·24 | 2·64 | 12·80 | 18 26 | | " |
| ..... | ....... | ..... | 10·00 | 8·00 | 2·00 | ....... | ...... | 17876 | |
| 5·76 | 3·68 | 1·59 | 11·03 | 9·44 | 2·10 | 10·48 | 18 58 | | |
| 6·88 | 2·39 | 3·04 | 12·31 | 9·27 | 4·44 | 17·75 | 20 83 | | Miss S. E. Wright ; unadulterated. |
| 5·00 | ....... | 2·00 | 10·00 | 8·00 | 1·50 | ....... | ....... | 17891 | |
| 7·68 | 1·75 | 2·88 | 12·31 | 9·43 | 1·85 | 14·00 | 19 74 | | |
| 5·43 | 4·17 | 3·51 | 13·11 | 9·60 | 5·46 | 17·10 | 24 08 | ... | " " |
| | | Not registered. | | | | | | | |
| ....... | ....... | ....... | ...... | ....... | ...... | ....... | ....... | 17901 | |
| 3 83 | 3·37 | 2·88 | 10·08 | 7·20 | 4·44 | 8·50 | 17 90 | | |
| 5·00 | ...... | 2·00 | 10·00 | 8·00 | 1·50 | ...... | ....... | 17903 | " " |
| 6·07 | 2·62 | 2·50 | 11·19 | 8·69 | 1·60 | 13·80 | 17 79 | | |
| 6 08 | 3·84 | 3·67 | 13·59 | 9·92 | 6·31 | 11·55 | 23 35 | ...... | " " |
| ..... | ....... | ..... | ...... | 10·50 | 1·50 | ...... | ....... | 17909 | |
| 7·35 | 2·73 | 7·67 | 17·75 | 10·08 | 1·35 | 11·65 | 23 41 | | |
| 6·23 | 1·93 | 7 99 | 16·15 | 8 16 | 2·22 | 14·10 | 18 83 | .... | Miss S. E Wright ; below guaranteed and standard. |
| 6·00 | ...... | 1·00 | 12 00 | 11 00 | 2·00 | ....... | ....... | 17918 | |
| 11·19 | ...... | 2·88 | 14·07 | 11 19 | 6·24 | 10·90 | 21 04 | | |
| 6·84 | 4·17 | 2·55 | 13·56 | 11·01 | 2·04 | 11·10 | 16 90 | ...... | Alphonse Lemoine ; unadulterated. |
| ....... | ....... | ....... | 10·00 | 8·00 | 2·00 | ....... | ....... | 23349 | |
| 5·76 | 3·35 | 1·44 | 10·55 | 9·11 | 2 00 | 11·64 | 17 28 | | |
| 5·56 | 2·95 | 1·40 | 9·91 | 8·51 | 2·24 | 12·40 | 17 23 | ..... | " " |

TABLE II.—Results of the Examination of 84

| Date of Collection. | No. of Sample. | Name and Address of — Vendor. | Name and Address of — Manufacturer or Furnisher as given by Vendor. | Name or Brand of Fertilizer. | Nitrogen. — Total including that of Nitric Acid or Ammonia if present. | Nitrogen. — Total calculated as Ammonia. |
|---|---|---|---|---|---|---|
| 1903. | | | | | p. c. | p. c. |
| April 20 | 23350 | O. Fournier, St. Alexandre, Iberville. | Bowker Fert. Co., Boston. | Potato and Vegetable Phosphate— | | |
| | | | | As guaranteed ..... .... | ........ | 2·00 |
| | | | | Standard sample (1445).... | 1·95 | 2·36 |
| | | | | Sample as sold........... | 1·69 | 2·05 |
| " 21 | 23352 | A. Bergeron, Iberville. | " .. | Corn Phosphate— | | |
| | | | | As guaranteed ......... | ...... | 2·00 |
| | | | | Standard sample (1443) ... | 1·60 | 1·94 |
| | | | | Sample as sold.. ......... | 1·54 | 2·65 |
| " 21 | 23353 | " .. | " .. | Potato and Vegetable Phosphate— | | |
| | | | | As guaranteed . ... .... | .... ... | 2·00 |
| | | | | Standard sample (1445) ... | 1·95 | 2·36 |
| | | | | Sample as sold..... ... | 1·95 | 2·36 |
| " 28 | 23370 | H. R. Thompson, Ulverton. | American Agricultural Chemical Co., Boston. | Bradley's Eclipse Phosphate— | | |
| | | | | As guaranteed . .. . | 1·03 | 1·25 |
| | | | | Standard sample (1403) ... | 1·10 | 1·42 |
| | | | | Sample as sold...... . .. | 1·46 | 1·77 |
| " 28 | 23371 | L. S. Plamondon, South Durham. | " .. | Bradley's Eclipse Phosphate— | | |
| | | | | As guaranteed . ... .... | 1·03 | 1·25 |
| | | | | Standard sample (1403) ... | 1·10 | 1·42 |
| | | | | Sample as sold.......... | 1·46 | 1·77 |
| " 28 | 23375 | Richard Dunn, South Durham. | Bowker Fert. Co., Boston. | Bowker's Vermont Fertilizer— | | |
| | | | | As guaranteed .......... | ........ | 3·00 |
| | | | | Standard sample (1439) ... | 2·45 | 2·98 |
| | | | | Sample as sold........... | 2·65 | 3·21 |
| " 30 | 23383 | M. Ferland, Berthierville. | Nichol's Chemical Co., Capelton. | Victor Complete Fertilizer— | | |
| | | | | As guaranteed ........... | . .... | 2·00 |
| | | | | Standard sample (1387) ... | 2·53 | 3·07 |
| | | | | Sample as sold...... .. . | 2·90 | 3·52 |
| May 1 | 23384 | S. Vessat & Co., Joliette. | " .. | Victor Fertilizer— | | |
| | | | | As guaranteed .... ...... | .. ..... | 2·00 |
| | | | | Standard sample (1387) ... | 2·53 | 3·07 |
| | | | | Sample as sold.. . ....... | 0·97 | 1·17 |
| " 1 | 23385 | " .. | " .. | Superphosphate— | | |
| | | | | As guaranteed .. ........ | ........ | ....... |
| | | | | Standard sample (1383) ... | 2·09 | 2·53 |
| | | | | Sample as sold........... | 0·57 | 0·69 |
| April 7 | 21243 | R. J. Latimer & Co., St. Maurice St., Montreal. | " .. | Victor Fertilizer— | | |
| | | | | As guaranteed ........... | ....... | 2·00 |
| | | | | Standard sample (1387) ... | 2·53 | 3·07 |
| | | | | Sample as sold...... ..... | 1·82 | 2·21 |
| " 7 | 21244 | " .. | " .. | Royal Canadian Fertilizer— | | |
| | | | | As guaranteed . ... | ....... | 4·00 |
| | | | | Standard sample (1386) ... | 4·21 | 5·11 |
| | | | | Sample as sold........... | 4·06 | 4·93 |
| " 7 | 21245 | Brodie & Harvie, Bleury St., Montreal. | Standard Chemical and Fertilizer Co., Smith's Falls, Ont. | Standard Fertilizer— | | |
| | | | | As guaranteed ..... ... | ... .... | 2·50 |
| | | | | Standard sample (1419) ... | 2·95 | 3·58 |
| | | | | Sample as sold.......... | 2·03 | 2·47 |
| " 7 | 21246 | " .. | " .. | Special Fertilizer— | | |
| | | | | As guaranteed ..... .... | ...... . | 3·50 |
| | | | | Standard sample (1418) ... | 3·92 | 4·76 |
| | | | | Sample as sold........... | 2·94 | 3·57 |

Samples of Fertilizers as sold in 1903—*Continued.*

| Results of Analysis. | | | | | | | Relative value per ton of 2,000 lbs. | No. of Samples. | Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| Phosphoric Acid. | | | | | Potash. | Moisture. | | | |
| Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | | |
| ...... | ...... | ...... | 11·00 | 9 00 | 2·00 | ...... | .... | 23356 | |
| 7·56 | 2·67 | 1·28 | 11·51 | 10·23 | 2·88 | 3·52 | 20 48 | | |
| 4·28 | 5·70 | 1·40 | 11·38 | 9·98 | 2·37 | 13·65 | 18 69 | .... | Miss S. E. Wright; unadulterated. |
| ...... | ...... | ...... | 10·00 | 8·00 | 2·00 | ...... | ...... | 23352 | |
| 5·76 | 3·35 | 1·44 | 10·55 | 9·11 | 2 00 | 11·64 | 17 28 | | |
| 4·92 | 3·40 | 1·72 | 10·04 | 8·32 | 2·37 | 11·00 | 16 55 | ..... | " " |
| ...... | ...... | ...... | 11 00 | 9·00 | 2·00 | ...... | .... | 23353 | |
| 7·56 | 2·67 | 1 28 | 11·51 | 10·23 | 2·88 | 3·52 | 20 48 | | |
| 3·96 | 5·76 | 1·28 | 11·00 | 9·72 | 2·62 | 10·45 | 19 29 | ..... | " " |
| 6·00 | ...... | 2·00 | 10·00 | 8·00 | 2·00 | ...... | ...... | 23370 | |
| 6·40 | 3·35 | 3·84 | 13·59 | 9·75 | 2·09 | 11·10 | 17 56 | | |
| 5·75 | 3·08 | 3·32 | 12 15 | 8·83 | 2·33 | 13·15 | 17 54 | ..... | " " |
| 6·00 | ...... | 2·00 | 10·00 | 8·00 | 2·00 | ...... | ...... | 23371 | |
| 6·40 | 3·35 | 3·84 | 13·59 | 9·75 | 2·09 | 11·10 | 17 56 | | |
| 7·67 | 2·25 | 2·87 | 12·79 | 9·92 | 2·29 | 14 60 | 18 73 | ..... | " " |
| ...... | ...... | ...... | 10·00 | 8·00 | 4·00 | ...... | ... | 23375 | |
| 5·24 | 3·72 | 1·92 | 10·87 | 8·96 | 4 50 | 13·00 | 21 99 | | |
| 6·71 | 2 70 | 2 23 | 11·64 | 9·41 | 3·92 | 16·35 | 22 70 | .... | " " |
| ...... | ...... | ...... | ...... | 7·00 | 3·00 | ...... | ...... | 23383 | |
| 10·55 | 0·97 | 4·40 | 15·92 | 11·52 | 2·94 | 9·90 | 24 69 | | |
| 5·24 | 2·95 | 3·96 | 12·15 | 8·19 | 3·10 | 11·30 | 21 51 | ..... | " " |
| ...... | ...... | ...... | ...... | 7·00 | 3·00 | ...... | ...... | 23384 | |
| 10·55 | 0·97 | 4·40 | 15·92 | 11 52 | 2·94 | 9·90 | 24 69 | | |
| 6·07 | 2·12 | 4·60 | 12·79 | 8·19 | 3·05 | 13·75 | 16 71 | ..... | " " |
| ...... | ...... | ...... | ...... | 8·00 | ...... | ...... | ...... | 23385 | |
| 8·15 | 2·57 | 6·07 | 16·79 | 10·72 | 2·18 | 11·25 | 22 15 | | |
| 6·72 | 1·60 | 4·80 | 13·12 | 8·32 | 0·27 | 11·76 | 13 02 | .... | Miss E. Davidson; genuine. |
| ...... | ...... | ...... | ...... | 7·00 | 3·00 | ...... | ...... | 21243 | |
| 10·55 | 0·97 | 4·40 | 15·92 | 11·52 | 2·94 | 9·90 | 24 69 | | |
| 5·03 | 1·73 | 4·59 | 11·35 | 6·76 | 3 79 | 13·90 | 18 01 | ..... | Prof. J. T. Donald; according to guarantee. |
| ...... | ...... | ...... | ...... | 9·00 | 5·00 | ...... | ...... | 21244 | |
| 8·95 | 0·14 | 3·83 | 12·92 | 9·09 | 5·99 | 7·05 | 39 75 | | |
| 5·37 | 1·07 | 4·14 | 10·58 | 6·44 | 5·62 | 9·40 | 25 30 | ...... | Prof. J. T. Donald; below guarantee in phosphoric acid. |
| ...... | ...... | ...... | 11·00 | 9·00 | 2·00 | ...... | ...... | 21245 | |
| 8·64 | 1·67 | 2·55 | 12·86 | 10·31 | 2·76 | 12·24 | 23 54 | | |
| 7 23 | 1·91 | 2·31 | 11·45 | 9 14 | 2·27 | 12·66 | 25 37 | .... | Prof. J. T. Donald; according to guarantee. |
| ...... | ...... | ...... | 10·00 | 8·00 | 6·00 | ...... | ...... | 21246 | |
| 7·99 | 2·09 | 1·43 | 11·51 | 10·08 | 7·06 | 15·04 | 29 92 | | |
| 6·45 | 1·54 | 1·98 | 9·97 | 7·99 | 6·85 | 10·51 | 24 85 | ..... | " " |

TABLE II.—Results of the Examination of 84

| Date of Collection. | No. of Sample. | Name and Address of |  | Name of Brand of Fertilizer. | Nitrogen. |  |
|---|---|---|---|---|---|---|
|  |  | Vendor. | Manufacturer or Furnisher as given by Vendor. |  | Total including that of Nitric Acid or Ammonia if present. | Total calculated as Ammonia. |
| 1903. |  |  |  |  | p. c. | p. c. |
| April 9 | 21247 | Laing Pork Packing Co., Mill St., Montreal. | Vendors...... ...... | Tankage Fertilizer— |  |  |
|  |  |  |  | As guaranteed ..... . . | 8·33 | 10·12 |
|  |  |  |  | Standard sample (1394) ... | 8·36 | 10·15 |
|  |  |  |  | Sample as sold . ...... . | 6·61 | 8·03 |
| 〃 27 | 21248 | Wm. Ewing & Co., McGill Street, Montreal. | Freeman Fert. Co... | Celery and Early Vegetable Manure— |  |  |
|  |  |  |  | As guaranteed ... .. ... | ... ... | 6·00 |
|  |  |  |  | Standard sample (1427).... | 4·48 | 5·44 |
|  |  |  |  | Sample as sold.......... | 3·08 | 3·86 |
| 〃 27 | 21249 | 〃 .. | 〃 . | Sure Growth— |  |  |
|  |  |  |  | As guaranteed .......... | ....... | 3·50 |
|  |  |  |  | Standard sample (1425).... | 3·32 | 4·03 |
|  |  |  |  | Sample as sold... ...... | 3·22 | 3·91 |
| 〃 27 | 21250 | 〃 .. | 〃 .. | Tankage— |  |  |
|  |  |  |  | As guaranteed .. .. .... | ....... | 5·00 |
|  |  |  |  | Standard sample (1431).... | 6·16 | 7·48 |
|  |  |  |  | Sample as sold.. ......... | 3·15 | 3·82 |
| May 6 | 21251 | Keddy & Kenny, Hemmingford, P.Q. | Nichols Chemical Co. | Capelton Superphosphate— |  |  |
|  |  |  |  | As guaranteed ......... | ... ... | ........ |
|  |  |  |  | Standard sample (1383).... | 2·09 | 2·53 |
|  |  |  |  | Sample as sold......... . | 0·70 | 0·85 |
| 〃 6 | 21252 | 〃 .. | American Agricultural Chemical Co. | Eclipse (Bradley's)— |  |  |
|  |  |  |  | As guaranteed . . .. ... | 1·03 | 1·25 |
|  |  |  |  | Standard sample (1403).... | 1·10 | 1·42 |
|  |  |  |  | Sample as sold........... | 1·48 | 1·80 |
| April 21 | 23157 | W. P. Peters, Brock St., Kingston. | Albert Thomas Phosphate Co. | Albert Thomas Phosphate— |  |  |
|  |  |  |  | As guaranteed ......... | ........ | ........ |
|  |  |  |  | Standard sample (1396).... | ........ | ........ |
|  |  |  |  | Sample as sold.. ... ..... | ... ... | ... .... |
| 〃 21 | 23158 | H. Brown & Son, King St., Brockville. | American Agricultural Chemical Co. | Potato Fertilizer— |  |  |
|  |  |  |  | As guaranteed . ... .... | 2·06 | 2·50 |
|  |  |  |  | Standard sample (1405).... | 2·07 | 2·51 |
|  |  |  |  | Sample as sold...... . . | 3.25 | 3·95 |
| 〃 21 | 23159 | 〃 .. | 〃 〃 .. | New Method Fertilizer— |  |  |
|  |  |  |  | As guaranteed . ... ..... | 1·03 | 1·25 |
|  |  |  |  | Standard sample (1406).... | 1·22 | 1·47 |
|  |  |  |  | Sample as sold.. ....... | 2·31 | 2·81 |
| 〃 21 | 23160 | 〃 .. | 〃 〃 .. | B. D. Seafowl Guano— |  |  |
|  |  |  |  | As guaranteed . ......... | 2·06 | 2·50 |
|  |  |  |  | Standard sample (1437).... | 2·78 | 3·38 |
|  |  |  |  | Sample as sold...... . .. | 2·40 | 2·91 |
| 〃 21 | 23161 | A. E. Cameron, Brockville. | Nichols Chemical Co. | Victor Fertilizer— |  |  |
|  |  |  |  | As guaranteed . ... ..... | . . ... | 2·00 |
|  |  |  |  | Standard sample (1387).... | 2·53 | 3·07 |
|  |  |  |  | Sample as sold...... . .. | 2·76 | 3·35 |
| 〃 21 | 23162 | 〃 .. | 〃 .. | Royal Canadian— |  |  |
|  |  |  |  | As guaranteed .......... | ........ | 4·00 |
|  |  |  |  | Standard sample (1386).... | 4·21 | 5·11 |
|  |  |  |  | Sample as sold. ........ | 3·38 | 4·10 |
| 〃 22 | 23163 | R. W. Ross & Co., Prescott, Ont. | Read Fert. Co... .. | Vegetable and Vine— |  |  |
|  |  |  |  | As guaranteed........ .. | ........ | ........ |
|  |  |  |  | Sample as sold.......... | 1·67 | 2·03 |
| 〃 22 | 23164 | 〃 .. | 〃 ...... | Farmer's Friend— |  |  |
|  |  |  |  | As guaranteed ........... | ....... | ... ..... |
|  |  |  |  | Sample as sold.... . . ... | 1·55 | 1·88 |

Samples of Fertilizers as sold in 1903—*Continued.*

| Results of Analysis. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Phosphoric Acid. | | | | | Potash. | Moisture. | Relative value per ton of 2,000 lbs. | No. of Sample. | Name of Analyst and Remarks. |
| Soluble in Water. | Citric Soluble. | In-soluble. | Total. | Total Available. | | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | | |
| .... | .... | .... | 9·40 | .... | .... | .... | .... | 21247 | |
| 1·28 | 6·88 | 1·75 | 9·91 | 8·16 | 0·27 | 11·96 | 29 97 | | |
| 0·35 | 10·50 | 2·57 | 13·42 | 10·85 | 0·15 | 13·18 | 28 76 | .... | Prof. J. T. Donald: above guarantee in phosphoric acid; below in ammonia. |
| .... | .... | .... | 9·00 | .... | 6·00 | .... | .... | 21248 | |
| 3·83 | 2·89 | 3·83 | 10·55 | 6·72 | 6·83 | 11·72 | 27 75 | | |
| 2·36 | 6·88 | 3·71 | 12·95 | 9·24 | 7·24 | 11·64 | 27 12 | .... | Prof. J. T. Donald; below guarantee in ammonia. |
| .... | .... | .... | 8·00 | .... | 3·00 | .... | .... | 21249 | |
| 3·32 | 3·72 | 4·47 | 11·51 | 7·04 | 3·14 | 14·50 | 21 34 | | |
| 3·00 | 2·17 | 4·81 | 9·99 | 5·17 | 2·76 | 10·85 | 18 63 | .. | Prof. J. T. Donald; according to guarantee. |
| .... | .... | .... | 12·00 | .... | .... | .... | .... | 21250 | |
| 0·63 | 11·68 | 3·99 | 16·30 | 12·31 | .... | 4·68 | 29 59 | | |
| 2·56 | 4·79 | 5·20 | 12·55 | 7·35 | 2·68 | 11·57 | 20 27 | .... | Prof. J. T. Donald; below guarantee in ammonia. |
| .... | .... | .... | .... | 8·00 | .... | .... | .... | 21251 | |
| 8·15 | 2·57 | 6·07 | 16·79 | 10·72 | 2·18 | 11·25 | 22 15 | | |
| 5·61 | 0·68 | 6·03 | 12·32 | 6·29 | 0·15 | 11·41 | 11 27 | .... | Prof. J. T. Donald; below guarantee in available phosphoric acid. |
| 6·00 | .... | 2·00 | 10·00 | 8·00 | 2·00 | .... | .... | 21252 | |
| 6·40 | 3·35 | 3·84 | 13·59 | 9·75 | 2·09 | 11·10 | 17 56 | | |
| 5·03 | 4·02 | 2·94 | 11·99 | 9·05 | 1·92 | 10·65 | 17 21 | .... | Prof. J. T. Donald; according to guarantee. |
| .... | .... | .... | .... | .... | .... | .... | .... | 23157 | |
| .... | 14·55 | 4·00 | 18·55 | 14·55 | .... | 0·20 | 18 80 | | |
| .... | 13·95 | 4·48 | 18·43 | 13·95 | .... | 2·70 | 18 48 | .... | Prof. E. B. Kenrick: genuine. |
| 5·00 | .... | 2·00 | 10·00 | 8·00 | 3·00 | .... | .... | 23158 | |
| 6·07 | 1·39 | 2·23 | 10·23 | 9·00 | 3·48 | 13·95 | 18 46 | | |
| 5·92 | 1·72 | 2·91 | 10·55 | 7·64 | 2·45 | 10·93 | 20 88 | .... | " " |
| 6·00 | .... | 2·00 | 10·00 | 8·00 | 2·00 | .... | .... | 23159 | |
| 6·07 | 1·48 | 2·87 | 10·42 | 7·55 | 2·14 | 13·55 | 15 18 | | |
| 6·23 | 2·69 | 1·38 | 10·30 | 8·92 | 1·97 | 9·85 | 18 93 | .... | " " |
| 6·00 | .... | 1·00 | 9·00 | 8·00 | 1·50 | .... | .... | 23160 | |
| 6·07 | 2·76 | 2·11 | 10·94 | 8·83 | 1·62 | 14·65 | 19 88 | | |
| 5·81 | 3·37 | 2·51 | 11·69 | 9·18 | 1·83 | 11·46 | 19 59 | .... | " " |
| .... | .... | .... | 7·00 | 3·00 | .... | .... | .... | 23161 | |
| 10·55 | 0·97 | 4·40 | 15·92 | 11·52 | 2·94 | 9·90 | 24 69 | | |
| 4·50 | 1·02 | 5·46 | 11·28 | 5·82 | 3·15 | 10·00 | 19 01 | ... | " " |
| .... | .... | .... | 9·00 | 5·00 | .... | .... | .... | 23162 | |
| 8·95 | 0·14 | 3·83 | 12·92 | 9·09 | 5·99 | 7·05 | 29 28 | | |
| 4·72 | 1·54 | 5·02 | 11·28 | 6·26 | 7·61 | 7·94 | 25 64 | ... | Prof. E. B. Kenrick genuine. |
| Not registered under this name. | | | | | | | | | |
| .... | .... | .... | .... | .... | .... | .... | .... | 23163 | |
| 5·95 | 2·96 | 2·50 | 11·41 | 8·91 | 5·47 | 10·15 | 21 23 | .... | Prof. E. B. Kenrick. |
| Not registered under this name. | | | | | | | | | |
| .... | .... | .... | .... | .... | .... | .... | .... | 23164 | |
| 7·08 | 2·81 | 3·17 | 13·06 | 9·89 | 3·81 | 10·92 | 20 57 | . | " |

TABLE II.—Results of the Examination of 84

| | | Name and Address of | | | Nitrogen. | |
|---|---|---|---|---|---|---|
| Date of Collection. | No. of Samples. | Vendor. | Manufacturer or Furnisher as given by Vendor. | Name or Brand of Fertilizer. | Total including that of Nitric Acid or Ammonia if present. | Total calculated as Ammonia. |
| 1903. | | | | | p. c. | p. c. |
| April 22 | 23165 | R. W. Ross & Co., Prescott, Ont. | Read Fert. Co...... | Standard— | | |
| | | | | As guaranteed .......... | 0·82 | 1·00 |
| | | | | Standard sample (1408).... | 1·19 | 1·45 |
| | | | | Sample as sold.......... | 1·12 | 1·36 |
| " 22 | 23166 | " .. | " .... | Potato Special— | | |
| | | | | As guaranteed .......... | 0·82 | 1·00 |
| | | | | Standard sample (1409).... | 1·06 | 1·29 |
| | | | | Sample as sold....... | 1·12 | 1·36 |
| " 18 | 23109 | Titterington & Co., King Street, St. Catharines, Ont. | American Agricultural Chemical Co. | Special No. 1 .......... | ...... | ........ |
| | | | | Sample as sold.......... | 1·90 | 2·31 |
| " 18 | 23110 | " .. | " " . | Complete Manure— | | |
| | | | | As guaranteed .......... | 3·29 | 4·00 |
| | | | | Standard sample (1438).... | 4·14 | 5·03 |
| | | | | Sample as sold......... | 2·89 | 3·51 |
| " 18 | 23111 | " .. | " " .. | Potato Fertilizer— | | |
| | | | | As guaranteed .......... | 2·06 | 2·50 |
| | | | | Standard sample (1405).... | 2·07 | 2·51 |
| | | | | Sample as sold.......... | 2·13 | 2·58 |
| " 18 | 23112 | " .. | " " .. | Seafowl Guano— | | |
| | | | | As guaranteed ....... | 2·06 | 2·50 |
| | | | | Standard sample (1437).... | 2·78 | 3·38 |
| | | | | Sample as sold.......... | 3·49 | 4·23 |
| " 18 | 23113 | R. R. Gage, St. Catharines. | Freeman Fert. Co., Hamilton. | Sure Growth— | | |
| | | | | As guaranteed .......... | ........ | 3·50 |
| | | | | Standard sample (1425).... | 3·32 | 4·03 |
| | | | | Sample as sold......... | 2·66 | 3·23 |
| " 18 | 23114 | R. R. Gage, St. Catherines, Ont. | Freeman Fert. Co., Hamilton. | Potato Manure— | | |
| | | | | As guaranteed............ | ........ | 3·00 |
| | | | | Standard sample (1430).... | 2·95 | 3·58 |
| | | | | Sample as sold .......... | 2·68 | 3 26 |
| " 16 | 23441 | Wm. Taylor, Barrie, Ont. | " .. | Bone Meal— | | |
| | | | | As guaranteed .......... | ....... | 3·00 |
| | | | | Standard sample (1433).... | 3 50 | 4·25 |
| | | | | Sample as sold.......... | 5·08 | 6·17 |
| " 16 | 23442 | Wm. Taylor, Barrie, Ont. | Imported. .......... | Thomas Phosphate Powder— | | |
| | | | | As guaranteed .......... | ........ | ........ |
| | | | | Standard sample (1396).... | ........ | ........ |
| | | | | Sample as sold .......... | ........ | ........ |
| " 17 | 23443 | J. A. Bruce & Co., King St., Hamilton. | American Chemical Agricultural Co., N. Y. | Bone Dust— | | |
| | | | | As guaranteed .......... | 2·50 | 3·00 |
| | | | | Standard sample (1407) ... | 2·78 | 3·38 |
| | | | | Sample as sold .......... | 2·24 | 2·72 |
| " 17 | 23444 | " .. | G. C. Watson, Philadelphia. | Peruvian Guano Flower Fertiliser. | ........ | ........ |
| | | | | Sample as sold.......... | 2·10 | 2·55 |
| " 16 | 22068 | Halman & Co., Berlin. | Armour & Co., Chicago. | Meatmeal Fertilizer .......... | ........ | ........ |
| | | | | Sample as sold.......... | 8·44 | 10·25 |
| " 17 | 22073 | Struther & Church, Galt. | .................. | Thomas Phosphate Fertilizer— | | |
| | | | | As guaranteed .......... | ........ | ........ |
| | | | | Standard sample (1396).... | ........ | ........ |
| | | | | Sample as sold.......... | ........ | ........ |
| " 21 | 22083 | Morton & Christy, Windsor, Ont. | Michigan Carbon Works, Detroit, U.S. | Fertiliser .......... | ........ | ........ |
| | | | | Sample as sold.......... | 2·84 | 3·45 |

Samples of Fertilizers as sold in 1903—*Concluded.*

| Results of Analysis. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Phosphoric Acid. | | | | | | | Relative value per ton of 2,000 lbs. | No. of Sample. | Name of Analyst and Remarks. |
| Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | Potash. | Moisture. | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | | |
| 5·00 | ....... | 2·00 | 10·00 | 8·00 | 4·00 | ...... | ...... | 23165 | |
| 5·11 | 4·17 | 3·35 | 12·63 | 9·28 | 4·48 | 12·16 | 19 51 | | |
| 6·33 | 2·53 | 2·13 | 10·99 | 8·86 | 4·27 | 9·72 | 18 41 | .... | Prof. E. B. Kenrick; genuine. |
| 2·00 | ...... | 1·00 | 5·00 | 4·00 | 8·00 | ....... | ........ | 23166 | |
| 3·99 | 2·41 | 2·07 | 8·47 | 6·40 | 8·69 | 6·04 | 19 95 | | |
| 2·61 | 1·70 | 1·74 | 6·05 | 4·31 | 8·03 | 7·10 | 16 86 | ..... | " " |
| Not registerd under this name. | | | | | | | | 23109 | |
| 6·24 | 2·44 | 3·35 | 11·83 | 8·48 | 7·87 | 10·16 | 24 32 | . | Miss E. Davidson. |
| 6·00 | ....... | 1·00 | 9·00 | 8·00 | 7·00 | ....... | ..... | 23110 | |
| 5·75 | 2·89 | 2·55 | 11·19 | 8·64 | 7·10 | 9·35 | 29 30 | | |
| 5·28 | 4·62 | 3·36 | 13·26 | 9·90 | 9·10 | 8·00 | 29 49 | ...... | Miss E. Davidson; unadulterated. |
| 5·00 | ........ | 2·00 | 10·00 | 8·00 | 3·00 | ....... | ....... | 23111 | |
| 6·07 | 1·39 | 2·23 | 10·23 | 9·00 | 3·48 | 13·95 | 18 46 | | |
| 6·88 | 3·04 | 1·75 | 11·67 | 9·92 | 6·36 | 11·06 | 24 34 | .... | " " |
| 6·00 | ........ | 1·00 | 9·00 | 8·00 | 1·50 | ...... | ....... | 23112 | |
| 6·07 | 2·76 | 2·11 | 10·94 | 8·83 | 1·62 | 14·65 | 19 88 | | |
| 3·36 | 4·47 | 4·00 | 11·83 | 7·83 | 2·62 | 9·60 | 21 97 | .... | " " |
| ....... | ....... | ...... | 8·00 | ....... | 3·00 | ..... | ........ | 23113 | |
| 3·32 | 3·72 | 4·47 | 11·51 | 7·04 | 3·14 | 14·50 | 21 34 | | |
| 4·48 | 2·88 | 5·43 | 12·79 | 7·36 | 3·98 | 12·76 | 21 28 | ... | " " |
| ....... | ...... | ....... | 9·00 | ....... | 5·00 | ...... | ....... | 23114 | |
| 4·31 | 3·53 | 4·79 | 12·63 | 7·84 | 7·54 | 13·16 | 26 08 | | |
| 4·79 | 3·66 | 5·75 | 14·20 | 8·45 | 3·14 | 13·60 | 21 77 | ..... | Alph. Lemoine; deficient in potash. |
| ....... | ..... | ..... | 23·00 | ....... | ........ | ........ | ...... | 23441 | |
| None. | 13·24 | 13·56 | 26·80 | 13·24 | None. | 6·90 | 27 13 | | |
| 0·70 | 11·89 | 8·31 | 20·90 | 12·59 | ........ | 6·65 | 28 60 | ..... | Alph. Lemoine; genuine. |
| ....... | ....... | ...... | ...... | ....... | ........ | ........ | ........ | 23442 | |
| ....... | 14·55 | 4·00 | 18·55 | 14·55 | ........ | 0·20 | 18 80 | | |
| ..... | 12·80 | 5·75 | 18·55 | 12·80 | ........ | Trace. | 18 10 | ..... | Alph. Lemoine; deficient in available phosphoric acid. |
| ....... | ....... | ....... | 21·00 | ....... | ........ | ....... | ..... | 23443 | |
| Trace. | 14·40 | 9·27 | 23·67 | 14·40 | ....... | 4·25 | 25 29 | | |
| 2·87 | 12·49 | 6·07 | 21·43 | 15·36 | 5·46 | 5·45 | ........ | ..... | Alph. Lemoine; unadulterated. |
| ....... | Not registered.. | | ....... | ....... | ........ | ........ | ...... | 23444 | |
| ....... | 15·36 | 10·55 | 25·91 | 15·36 | Trace. | 5·00 | ........ | ...... | Alph. Lemoine. |
| ....... | Not registered. | | ....... | ....... | ........ | ........ | ...... | 22068 | |
| 0·50 | 0·01 | 0·96 | 1·47 | 0·51 | 2·29 | 4·30 | ........ | ...... | " |
| ....... | ........ | ...... | ........ | ....... | ....... | ..... | ...... | 22073 | |
| ....... | 14·55 | 4·00 | 18·55 | 14·55 | ....... | 0·20 | 18 80 | | |
| ....... | 14·30 | 5·20 | 19·50 | 14·30 | ........ | Trace. | 19 37 | ...... | " genuine. |
| ....... | Not registered .. | | ....... | ....... | ....... | ....... | ........ | 22083 | |
| 3·60 | 3·16 | 1·00 | 7·16 | 6·16 | 6·19 | 9·05 | ...... | ..... | " |

TABLE II.—Results of the Examination of 84

| Date of Collection. | No. of Sample. | Name and Address of | | Name or Brand of Fertilizer. | Nitrogen. | |
|---|---|---|---|---|---|---|
| | | Vendor. | Manufacturer or Furnisher as given by Vendor. | | Total, including that of Nitric Acid or Ammonia if present. | Total calculated as Ammonia. |
| 1903. | | ........... ..... | | | p. c. | p. c. |
| April 21 | 22085 | John Geddins, Windsor. | R. Evans, Hamilton. | Ground Bone— | | |
| | | | | As guaranteed............ | 2·50 | 3·00 |
| | | | | Standard sample (1407).... | 2·78 | 3·38 |
| | | | | Sample as sold ......... | 2·71 | 3·29 |
| " 23 | 22093 | Darch & Hunter, London. | Michigan Carbon Works. | Bonemeal Fertiliser— | | |
| | | | | As guaranteed ......... | ...... | 1·50 |
| | | | | Standard sample (1474).... | 1·27 | 1·54 |
| | | | | Sample as sold........... | 1·91 | 2·31 |
| " 23 | 22095 | A. McInnis, London. | John McMeghan, Soap Manufacturer | Crown Jewel Fertilizer.... .. | ... .... | ... ... |
| | | | | Sample as sold....... . . | 8·35 | 10·14 |
| " 23 | 22100 | Ingersoll Packing Co., Ingersoll. | Vendor ........... | Ingersoll Fertilizer— | | |
| | | | | As guaranteed .... ..... | ........ | 9·00 |
| | | | | Standard sample (1434).... | 7·92 | 8·40 |
| | | | | Sample as sold.. ......... | 8·00 | 9·72 |
| " 24 | 22105 | J. H. McMeghan, London. | London Soap Co., London. | Tankage— | | |
| | | | | As guaranteed .......... | ........ | ........ |
| | | | | Standard sample (1435).... | 9·21 | 11·18 |
| | | | | Sample as sold .. . . | 8·19 | 9·94 |
| " 26 | 22108 | G. Carter & Son, St. Mary's. | Thomas Phosphate Co., England. | Thomas Phosphate Fertilizer— | | |
| | | | | As guaranteed ...... .... | ..... . | ........ |
| | | | | Standard sample (1396).. . | ....... | .. .... |
| | | | | Sample as sold..... ...... | . .... . | ........ |
| " 23 | 23527 | M. J. Henry, Vancouver, B.C. | Imported..... .... | Bone Meal— | | |
| | | | | Standard sample (1463)?.. | 2·98 | 3·62 |
| | | | | Sample as sold ..... .... | 4·56 | 5·56 |
| " 23 | 23528 | " .. | Victoria Chemical Co. | Nitrate of Soda— | | |
| | | | | As guaranteed.......... | 16·00 | ........ |
| | | | | Standard sample (1480) ... | 15·93 | 19·35 |
| | | | | Sample as sold ..... .... | 15·94 | 19·35 |
| " 23 | 23529 | " .. | " .. | Sulphate of Potash— | | |
| | | | | As guaranteed ...... .... | ...... | ........ |
| | | | | Standard sample (1478) ... | ........ | ........ |
| | | | | Sample as sold ....... .. | .. .... | ...... . |
| " 23 | 23530 | " .. | " .. | Muriate of Potash— | | |
| | | | | As guaranteed........... | ....... | ........ |
| | | | | Standard sample (1476) ... | ........ | ........ |
| | | | | Sample as sold .......... | ........ | ........ |
| " 24 | 23531 | C. Nelson, Vancouver, B.C. | " .. | Fertilizer B— | | |
| | | | | As guaranteed .......... | 3·50 | ... .... |
| | | | | Standard sample (1483) ... | 2·79 | 3·38 |
| | | | | Sample as sold .......... | 3·14 | 3·81 |
| " 25 | 23536 | Victoria Chemical Co., Victoria, B.C. | Vendors.... .. .... | Superphosphate— | | |
| | | | | As guaranteed........... | ....... | . .... |
| | | | | Standard sample (1481) ... | Trace. | Trace. |
| | | | | Sample as sold. .... ... | 9·59 | 0·71 |
| " 25 | 23537 | " .. | " ..... .... | Fertilizer "A" | | |
| | | | | As guaranteed... ..... | 4·00 | .. .... |
| | | | | Standard sample (1482) ... | 3·46 | 4·20 |
| | | | | Sample as sold ......... . | 3·00 | 3·63 |
| 25 | 23538 | " .. | " .... . .. | Fertilizer "B"— | | |
| | | | | As guaranteed .. .. ..... | 3·56 | ........ |
| | | | | Standard sample (1483) ... | 2·79 | 3·38 |
| | | | | Sample as sold ... .. .... | 3·30 | 4·00 |

Samples of Fertilizers as sold in 1903—*Continued.*

RESULTS OF ANALYSIS.

| Phosphoric Acid. | | | | | Potash. | Moisture. | Relative value per ton of 2,000 lbs. | No. of Sample. | Name of Analyst and Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | | |
| .... | .... | .... | 21·00 | .... | .... | .... | .... | 22085 | |
| Trace. | 14·40 | 9·27 | 23·67 | 14·40 | .... | 4·25 | 25·29 | | |
| Trace. | 15·33 | 9·27 | 24·60 | 15·33 | Trace. | 5·10 | 26·11 | .... | Alph. Lemoine; genuine. |
| .... | .... | .... | 25·00 | .... | .... | .... | .... | 22093 | |
| None. | 17·01 | 15·99 | 33·00 | 17·01 | Trace. | 2·75 | 26·56 | | |
| .... | 18·85 | 13·43 | 31·98 | 18·55 | .... | 3·08 | 25·31 | .... | Miss E. Davidson; genuine. |
| .... | Not registered .. | | .... | .... | .... | .... | .... | 22095 | |
| 2·08 | 2·57 | 2·71 | 7·36 | 4·65 | 0·50 | 6·64 | .... | .... | " |
| .... | .... | .... | 6·80 | .... | .... | 8·00 | .... | 22100 | |
| Trace. | 11·84 | 2·36 | 14·20 | 11·84 | 0·20 | 15·12 | 32·94 | | |
| Trace. | 10·24 | 2·39 | 12·63 | 10·24 | 0·44 | 13·08 | 31·66 | .. | " unadulterated. |
| .... | .... | .... | .... | .... | .... | .... | .... | 22105 | |
| Trace. | 1·27 | 2·23 | 3·60 | 1·27 | 0·30 | 11·75 | 26·33 | | |
| Trace. | 4·96 | 1·76 | 6·72 | 4·96 | 0·32 | 6·08 | 25·99 | .... | " " |
| .... | .... | .... | .... | .... | .... | .... | .... | 22108 | |
| .... | 14·55 | 4·00 | 18·55 | 14·55 | .... | 0·20 | 18·80 | | |
| .... | 13·27 | 4·32 | 17·59 | 13·27 | .... | 6·64 | 17·62 | .... | " " |
| Trace. | 15·66 | 10·39 | 26·05 | 0·66 | .... | 8·75 | 27·50 | 23527 | |
| .... | 15·00 | 9·50 | 24·50 | 15·00 | None. | 6·20 | 30·29 | .... | Dr. C. J Fagan: genuine. |
| .... | .... | .... | .... | .... | .... | 0·65 | 41·42 | 23528 | |
| .... | .... | .... | .... | .... | .... | 1·76 | 41·44 | | |
| .... | .... | .... | .... | .... | .... | .... | .... | .... | " |
| .... | .... | .... | .... | .... | 53·00 | .... | .... | 23529 | |
| .... | .... | .... | .... | .... | 53·46 | 6·00 | 56·13 | | |
| .... | .... | .... | .... | .... | 50·30 | 2·22 | 52·81 | .... | " |
| .... | .... | .... | .... | .... | 53·00 | .... | .... | 23530 | |
| .... | .... | .... | .... | .... | 55·58 | 0·12 | 58·36 | | |
| .... | .... | .... | .... | .... | 56·87 | 2·44 | 59·69 | .... | " |
| .... | .... | .... | 9·00 | .... | 11·00 | .... | .... | 23531 | |
| 10·23 | 1·60 | .... | 11·83 | 11·83 | 12·03 | 9·40 | 33·92 | | |
| 10·80 | 0·50 | 0·50 | 11·80 | 11·30 | 13·96 | 7·22 | 36·48 | .. | " |
| .... | .... | .... | 16·00 | .... | .... | .... | .... | 23536 | |
| 16·12 | 2·56 | 0·64 | 19·32 | 18·68 | .... | 12·70 | 22·35 | | |
| 16·00 | 0·30 | 0·30 | 16·60 | 16·30 | None. | 14·50 | 44·55 | .... | " |
| .... | .... | .... | 10·00 | .... | 7·00 | .... | .... | 23537 | |
| 10·55 | 0·96 | 0·64 | 12·15 | 11·51 | 7·51 | 10·07 | 30·79 | | |
| 10·40 | 0·30 | 0·30 | 11·00 | 10·70 | 11·81 | 12·16 | 33·10 | .... | " but very badly mixed, large lumps of nitrate of potash being present. |
| .... | .... | .... | 9·00 | .... | 11·00 | .... | .... | 23538 | |
| 10·23 | 1·60 | .... | 11·83 | 11·83 | 12·03 | 9·40 | 33·92 | | |
| 9·60 | 0·30 | 0·25 | 10·15 | 9·90 | 12·00 | 13·30 | 33·10 | ... | Dr. C. J. Fagan; genuine, but badly mixed. |

TABLE II.—Results of the Examination of 84

| Date of Collection. | No. of Sample. | Name and Address of | | Name or Brand of Fertilizer. | Nitrogen. | |
|---|---|---|---|---|---|---|
| | | Vendor. | Manufacturer or Furnisher as given by Vendor. | | Total including that of Nitric Acid or Ammonia if present. | Total calculated as Ammonia. |
| 1903. | | | | | p. c. | p. c. |
| April 25 | 23539 | Victoria Chemical Co., Victoria, B.C | Vendor | Fertilizer "C"— | | |
| | | | | As guaranteed | ........ | ........ |
| | | | | Standard sample (1484) | ........ | ..... |
| | | | | Sample as sold | 0·75 | 0·91 |
| " 25 | 23540 | " | " | Thomas Phosphate— | | |
| | | | | As guaranteed | ........ | ........ |
| | | | | Standard sample (1479) | ... .... | ........ |
| | | | | Sample as sold | None. | None. |

Samples of Fertilizers as sold in 1903—*Concluded.*

| Results of Analysis. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Phosphoric Acid. | | | | | Potash. | Moisture. | Relative value per ton of 2,000 lbs. | No. of Samples. | Name of Analyst and Remarks. |
| Soluble in Water. | Citric Soluble. | Insoluble. | Total. | Total Available. | | | | | |
| p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | p. c. | $ cts. | | |
| ...... | ...... | ...... | 12·50 | ........ | 11·00 | ........ | ...... | 23539 | |
| 14·52 | 1·47 | ........ | 15·99 | 15·99 | 11·56 | 9·10 | 31 16 | | |
| 13·10 | 0·40 | 0·30 | 13·80 | 13·50 | 11·43 | 12·56 | 30 20 | .. | Dr. C. J. Fagan ; genuine but badly mixed. |
| ...... | ...... | ...... | 15·00 | ........ | ........ | ........ | ...... | 23540 | |
| ........ | 12·47 | 4·31 | 16·78 | 12·47 | ....... | 0·04 | 16 74 | | |
| None. | 11·40 | 3·60 | 15·00 | 11 40 | None. | 0·28 | 15 06 | .. | Dr. C. J. Fagan ; genuine. |

## MEMORANDA ON MANURES.

Since this publication is intended for circulation among our farmers, it has been thought advisable to take advantage of its issue by reprinting some of the notes which have appeared in former bulletins, and adding a few additional particulars from works which have recently appeared, regarding the application of natural manures and artificial fertilizers.

It is about fifty years since Stoeckhardt, at that time professor in the agricultural school of Tharandt, Saxony, said that a farmer who bought guano, bonemeal, or other artificial fertilizers, and at the same time neglected to make proper use of the dung of the cattle on his own farm, must be regarded as an agricultural spendthrift. Every intelligent farmer in Canada will in these modern days agree with the old German professor, and maintain that the treasury of the farm is the dungstead, and that leaks and emanations from it of valuable fertilizing constituents must lead to financial embarrassment and possibly ruin.

This statement may be positively made without in the slightest degree detracting from the merits of artificial fertilizers, for when properly selected and applied, their value becomes abundantly evident. The question as to whether their use is remunerative has been frequently discussed, and depends to a large extent on the care employed in their selection. Supposing that the intelligent farmer has considered composition, cost, &c., to the best of his ability, made his selection and applied the fertilizer, he may still be in doubt as regards the result unless he takes steps to make a manure trial with it. As regards the best way of doing this, Hellriegel, in a publication, dated 1897, has related his experience. He recognizes how difficult it is for practical agriculturists, fully occupied with their regular work, and engaged in meeting all the difficulties caused by workmen, weather and market rates, to carry out regularly planned manure experiments. He therefore describes a method which experience in his estimation had justified, and recommends it for the purpose of ascertaining whether any application of lime, marl, dung or fertilizers had really produced the improvement which from the point of view of cost had been expected. This plan is to pass over, at one or several places, properly selected, a few square rods of the field without applying the dung or fertilizer. In this way unmanured plots, which do not require to be measured with great exactitude, but merely paced, and do not need to be harvested separately, are left in the manured field, by means of which any improvement in the latter may be remarked and valued.

This plan exacts that it should be possible to *see* a distinct difference between the unmanured plots and the manured field, not only as regards the height and density of the resulting crop, but also in reference to the fullness of the ears and the development of the grains. In the event of such a distinct difference being invisible the manure is justly discredited as unfit for its intended purpose. It would seem advisable to recommend this plan to farmers who use fertilizers, because some of them may manure the whole field, fail to see any improvement on account of being unable to make comparisons, and perhaps condemn the fertilizer unjustly. The simplicity of the plan above described, and its applicability everywhere and every year would appear to commend it to the practical agriculturist. At the same time it is necessary to remark that there are instances on record of fertilizers having been applied and remaining utterly without effect owing to some defect in the soil. Such defects have often been cured by a previous application of marl or lime, which not only produced good effects themselves, but improved also the action of the fertilizers afterwards applied.

### THE CARE OF NITROGEN.

This element is the most valuable of fertilizing constituents, and one which is exceedingly liable to loss.

In many of the fertilizers described in this and former reports their cost is very much increased by the admixture of nitrogenous constituents. This cost farmers might save by properly caring for the stock of nitrogen on their farms, and this stock might even be increased by cultivating those crops which have the power of appropriating the nitrogen of the atmosphere. Nevertheless the fertilizer manufacturers still seem to be under the necessity of supplying this element in considerable quantity in their goods, and of charging for it. In the case of the mixed fertilizers, this extra charge varies from $8 to $14 per ton, which the farmer must pay if he purchases, and which he can readily save in his own stables or produce upon his own farm.

Nearly the whole of the nitrogen in the fodder fed to farm stock is to be found in the excreta of the animals, and one-half of it is contained in the urine. It is further well known that 95 per cent of the potash contained in the food of cattle and sheep may be recovered by carefully saving the liquid manure only. It has, however, been ascertained that stable-yard manure experiences considerable loss of its fertilizing constituents, but more especially of nitrogen, when left to itself in the dung heap. According to the experiments of Wolff, this loss amounts to 55 per cent of the nitrogen contained in fresh manure from horned cattle. The later experiments of Heiden and Holdefleiss place it at 23·4 per cent. These results were obtained when ordinary reasonable care is taken of the manure, but give no data for estimating the loss which occurs when, as is very frequently the case in Canada, the manure is treated with the grossest neglect. It is safe to assume that, generally, 50 per cent of the nitrogen contained in the barn-yard manure of this country returns unutilized to the atmosphere, or is otherwise lost by careless treatment. Supposing that an average quantity of 36,000 pounds is produced in fresh condition annually by each animal, and that it contains 0·4 per cent of nitrogen, it follows that a loss of 72 pounds of nitrogen, worth $8.64, takes place for each head of cattle. This loss can be prevented by daily strewing the stables with two pounds of ground plaster for each animal, which at once prevents any smell of ammonia from arising in the stable. The quantity prescribed means 700 lbs. or a cost of about $2.50 annually for each 1,000 lbs. live weight, but, by adopting this plan, the farmer would to a great extent be relieved from the necessity of purchasing the nitrogen of artificial fertilizers.

In a pamphlet published by Vieweg, 1859, entitled *Ein Pfund Stickstoff kaum einen Groschen*, which may be freely translated 'A pound of nitrogen for a penny,' Dr. Meyer Altenberg maintained that ground gypsum is the very best preservative of barn-yard manure when applied in the stable, because it secures 'certainty and completeness of effect, ease of execution, and the lowest possible cost.' He further described the effect of its application on the domain of Beberbeck in Hesse, and other impoverished farms, showing that it is possible to bring such into a fertile condition without the purchase of manure or fertilizers or feeding stuffs, excepting a little straw for bedding and oats for the horses.

### TREATMENT OF STABLE-YARD MANURE.

Dr. Meyer-Altenberg, in the little work above mentioned, takes care to point out that the use of gypsum, without subsequent careful treatment of the dungheaps, does not give the desired effect, and he dwells on the importance of having the manure thoroughly trodden down, and made as compact as possible. This is also shown in Dr. J. Koënig's prize essay, 'How can the farmer preserve and increase the stock of nitrogen on his property?' (Berlin, 1887.) In a special chapter of this work the author discusses 'The evolution of free nitrogen during the fermentation and storage of stable manure,' describes the experiments which were made from 1860 to 1885 regarding its treatment, and gives, finally, the results of the discussion from which the following sentences may be translated with advantage :—

1. In the decomposition of nitrogenous substances of every nature a loss, more or less considerable, of free nitrogen takes place.

2. This loss is the greater the more the atmosphere has access to the decomposing mass.

3. Too much moisture is just as hurtful as too little. Stable manure require such a degree of humidity as permits its components to lie close to each other.

4. The addition of substances which fix ammonia (such as gypsum, kainite and kieserite) prevent or reduce the loss of nitrogen. *These substances are, however, of little*

*or no value if care is not taken at the same time to prevent as much as possible the access of air.*

12. In storing stable manure in dungsteads the latter must be watertight and roofed in, and the treading down of their contents by the farm animals is to be recommended.

One thing in connection with this question is perfectly certain and that is that the use of gypsum, or ordinary ground land plaster, prevents any loss of nitrogen in the stable, and while the manure is being forwarded to the dungheap. Further, if the work from which the foregoing quotations have been made be carefully studied, and also the experiments and writings of Holdefleiss, Vogel and others, it appears to be quite certain that the use of the same article, or of the gypsum produced in the manufacture of 'acid-phosphate,' completely prevents the loss of ammonia from the liquid part of the manure, and also from the organic nitrogen of the solids, provided the whole has, previous to fermentation, been made thoroughly compact, and atmospheric air almost completely excluded. Where it is found impossible to attend to the latter precautions, the safest way will probably be found to lie in avoiding fermentation altogether, by conveying the fresh manure, after treatment with gypsum, on to the field to be manured and bringing it under the soil as rapidly as possible. The latter practice has been proved to be most advantageous by the experiments which have been carried on for some time past, at the Central Experimental Farm by Director Saunders. (See Reports for 1898.)

Not only has the addition of substances which have the faculty of fixing ammonia been recommended for stable manure, but its improvement to a greater extent has been proposed by the addition of fertilizers. The following quotation is taken from Bulletin No. 45 (for March, 1897) of the Massachusetts Agricultural College, and was written by Dr. C. A. Goessmann, Chemist for that institution :—

'*The practice of adding to the manurial refuse materials of the farm as stable manure, vegetable compost, &c., such single commercial manurial substances as will enrich them in the direction desirable for any particular crop to be raised, does not yet receive that degree of general attention which it deserves.*' (The italics are in the original.) An addition of potash in the form of muriate or sulphate of potash, or of phosphoric acid in the form of fine ground South Carolina or Florida soft phosphate, &c., will in many instances not only improve their general fitness as complete manure, but quite frequently permit a material reduction in the amount of barn-yard manure ordinarily considered sufficient to secure satisfactory results.'

'Average composition of seventy-five samples of barn-yard manure :—

| | Per cent. | Lbs. per ton. |
|---|---|---|
| Moisture | 67·00 | 1,340·0 |
| Nitrogen | 0·52 | 10·4 |
| Potassium oxide | 0·56 | 11·2 |
| Phosphoric acid | 0·39 | 7·8 |

The average barn-yard manure contains, it will be noticed from the above statement, a larger percentage of nitrogen, as compared with its potash and phosphoric acid than is generally considered economical. An addition of from thirty to forty pounds of muriate of potash, and of one hundred pounds of fine ground natural phosphate (soft Florida or South Carolina floats) per ton of barn-yard manure would greatly increase its value as an efficient and economical general fertilizer.'

These are no doubt most excellent suggestions, and there is no reason why these substances should not be introduced into the stable manure in the same manner as in the case of the ground plaster above mentioned. Plain superphosphate and kainite might also be used, some of the constituents which would be useful in fixing the ammonia, as soon as formed from the organic nitrogen. Should this suggestion be found to have practical value, there is no doubt that our fertilizer manufacturers would be found able to supply our farmers, at a moderate coat, with a mixture of ground plaster, superphosphate and kainite, in such proportions as experience might show to be most advantageous. No better application can be made of the wood ashes produced in the farmer's household than by mixing them with the barn-yard manure, and most excellent results are known to have followed this practice.

### ACQUISITION OF NITROGEN.

Not only can the farmer save almost the whole of the nitrogen contained in the fodder fed to his cattle, but he can actually increase the stock of it stored away in his fields, agricultural products and manure heaps, by a judicious course of crop rotation. For more than a century agricultural chemists have discussed the question as to whether free atmopheric nitrogen can be assimilated by plants, but it may now be regarded as perfectly settled in the affirmative, if regard is had only to the plants of the order leguminosæ, such as beans, pease, lentils, vetches, clovers, alfalfa, serradella, &c. Even the great English agriculturists, Sir J. B. Lawes and Sir Henry Gilbert, who had previously been of an opposite opinion, have now admitted that this appropriation of nitrogen has been completely proved. This acknowledgment was made by Sir Henry Gilbert, at a great meeting of agricultural chemists held at Halle, in Germany, in September, 1891. Thus, modern research has confirmed not only modern agricultural practice, but also the experience of antiquity, for Prof. W. Strecker has pointed out a passage in Pliny which says: 'Lupines require so little manure that they, in fact, replace it; vetches make the land more fertile. Corn should be sown where previously lupines or vetches have stood, because they enrich the land.'

It is not, however, to be supposed that this utilization of atmospheric nitrogen by leguminous plants can take place upon very poor soils or upon those destitute of the inorganic constituents which they require. The latter must in such cases be supplied in the shape of potash with some phosphoric acid, as was done with great success by Schultz, of Lupitz, a practical agriculturist in North Germany. In fact, had it not been for his investigations, the controversy above referred to might have contained without results up to the present hour.

Professor König, of Münster, gives the following summary of Schultz's experience:—

'Schultz acquired the farm Lupitz in the year 1855; its soil consisted of a poor, cold diluvial sand; the profit in working it was very small. Lupines yielded, indeed, as a fodder tolerable results, but when used as green manuring for rye and oats, no return was obtained from them. The application of artificial manures produced good crops, but they did not pay; burnt lime showed itself to be too heating. The use of manure was more favourable, especially when fertilizers containing phosphoric acid were used at the same time. But at the best the total result was not satisfactory.

'Shortly after Schultz acquired Lupitz, the great discovery of potash salts was made, and about 1860 they began to be produced from the mines of Stassfurth. Schultz made up his mind to try them as manure and he obtained the most surprising results. After lupines had shown themselves to be useless as forerunners of grain, they were excluded from the rotation and grown on a separate field without any manuring and alternating with sheep pasture. But the harvest on these became worse and worse until the field in question became quite lupine "sick." Schultz made his first trial on this field, manuring it with 300 pounds kainite per morgen (1 Prussian morgen = 0·631 acre); the sickness was at once cured, and for twenty-five years afterwards Schultz has grown lupines on this ground without interruption, always with the application of 300 pounds kainite. Schultz obtained similar good results on the ground which had received the marl, by the application of potash salts. This ground had indeed yielded well with lupines for two years after the application of the marl, but in the third year they sickened here too. When, however, 300 pounds kainite were applied here and ploughed in, the ground was cured, although an application of phosphates had not produced the desired results.

'The favourable influence which the manuring with kainite or potash salts had exerted on lupines induced Schultz to try them on grain, in conjunction with phosphates. But in this case he obtained contradictory results, according to the nature of the crops which preceded the grain. For instance, while grain sowed after lupines and manured with potash and phosphates yielded very good and remunerative harvests, these were not to be obtained if grain was grown after grain or after potatoes. This behaviour of these crops was explained by Schultz in this way: that lupines or deep-rooted plants leave in the soil after harvest a residue of root, in which a considerable amount of nitrogen has accumulated, an amount sufficient to supply the wants of the following grain crops; that, on the other hand, the application of potash and phosphates, to grain, after a preceding grain crop, is without effect, for the reason that the latter has consumed the stock of nitrogen. Grain crops always reduce this stock; never increase it. Schultz has given the name of "nitrogen collectors" to the lupines and similar plants, while grains are called "nitrogen consumers." His system of rotation is therefore the following:—Sow first nitrogen collectors (lupines, pease, beans, vetches, clover, lucerne, serradella, &c.), or, as they have been called, renovating crops, and give them 300 pounds kainite per morgen, with perhaps an addition 20 pounds phosphoric acid. After harvesting the nitrogen collectors, sow a nitrogen consumer, raising a grain or exhausting crop, giving it also 300 pounds kainite and 20 pounds phosphoric acid. The grain crop is perfectly successful, because the first crop left behind it nitrogen enough to supply the wants of the grain. In this way the keeping of stock, which is expensive on a poor sandy soil, can be reduced and the purchase of nitrogenous fertilizers dispensed with, because the nitrogen collectors are able to stock the soil with that valuable element.'

The foregoing description is taken from Professor König's 'Stickstoff Vorrath,' published in 1887 (Paul Parey, Berlin). It was in 1884, nearly thirty years after the purchase of his sandy farm, that Schultz, of Lupitz, published the results of his experience, although they did not contain anything very new and although they only confirmed experiences still older than his own. But his case was surprising and his explanation of the cause of his successful farming challenged the attention of scientific agriculturists. The consequence has been the issue of many pamphlets on the subject, and an activity in the region of agricultural experimenting which is not yet ended. Atwater, Wagner, Heiden, Hellriegel and many others have participated in these investigations, and Professor Wood, of the Storrs Agricultural School in Connecticut, has given the following general conclusions as the result of the work:—

1. 'Pease, alfalfa, serradella, lupine, clover in all probability, and apparently leguminous plants in general, are able to acquire large quantities of nitrogen from the air during their period of growth.

2. 'There is scarcely room to doubt that the free nitrogen of the air is thus acquired by plants.

3. 'That is a connection between root tubercles and this acquisition of nitrogen is clearly demonstrated. What this connection is, what are the relations of micro-organisms to the root tubercles and the acquisition of nitrogen, and in general how the nitrogen is obtained are questions still to be solved.

4. 'The cereals with which the experiments have been completed have not manifested this power of acquiring nitrogen, nor do they have such tubercles as are found on the roots of legumes.

5. 'In the experiments here reported, the addition of soil infusions did not seem necessary for the production of root tubercles. A plausible supposition is that the micro-organisms or their spores were floating in the air and were deposited in the pots in which the plants grew.

6. 'As a rule the greater the abundance of root tubercles in these experiments, the larger and more vigorous were the plants and the greater was the gain of nitrogen from the air.

7. 'In a number of these experiments, as in similar ones previously reported, there was a loss of nitrogen instead of gain. The loss occurred where there were no root tubercles; it was especially large with oat plants, and largest where they had the most nitrogen at their disposal in the form of nitrates. As the gain of nitrogen by the legumes helps explain why they act as renovating crops, the loss in the case of the oats suggests a possible reason why they should appear to be an exhausting crop.

'Practical inferences:—The ability of legumes to gather nitrogen from the air helps to explain the usefulness of clover, alfalfa, pease, beans, vetches and cow pease as renovating crops, and enforces the importance of these crops to restore fertility to exhausted soils. The judicious use of mineral fertilizers (containing phosphoric acid, potash and lime) will enable the farmer to grow crops of legumes which, after being fed to his stock, will, with proper care to collect and preserve all manure, both liquid and solid, enable him to return a complete fertilizer in the shape of a barn-yard manure to his land. A further advantage of growing these crops is that the nitrogenous material, protein, which they contain in such great abundance, is especially valuable for fodder.'

From the foregoing it seems that, in the present condition of our knowledge, the conclusion may be drawn that the atmosphere stands ready to furnish the farmer, gratis, with all the organic constituents which his crops require, provided always that he, on his part, will exercise a sufficient amount of skill and intelligence in approaching and retaining on his farm the fertilizing materials, and especially the nitrogen. If he does this, all that is necessary for him to provide, in order to replace the losses which his farm sustains from the sale of stock or produce, are the inorganic or mineral constituents of these, and especially the phosphoric acid and potash. There is much in all this to remind one of Sprengel and Liebigs teaching of fifty years ago, according to which a plant cannot thrive if its soil does not contain all the substances which are to be found in its ash.

## UTILIZATION OF SEWAGE.

The losses in fertilizing material which are sustained, as above mentioned, on account of the neglect or unscientific treatment of barn-yard manure, are very trifling when compared with those which the community suffers in the almost total loss of the nitrogen, phosphoric acid and potash contained in human excreta. The utilization of such always becomes a subject for discussion when the question is raised as to how a cheaper class of manures than the artificial fertilizers can be obtained for use in agriculture.

Where the water carriage system of removing sewage and excrement has been introduced, nothing is to be hoped for in the recovery of their fertilizing constituents. Even in cases where, at large expense, establishments have been erected for the treatment of sewage by precipitation or similar methods, the products have been found to be entirely destitute of agricultural value. The greater part of the fertilizing constituents of sewage are in such a soluble condition, and have been diluted with water to such an extent, as to render their recovery economically impossible. It has been attempted in the neighbourhood of many cities in England and on the continent of Europe to use the sewage for irrigation and as liquid manure, but this method of utilization has been found to be in the highest degree imperfect. At Berlin, it has been proved, that of the nitrogen contained in its sewage, at the very most only 13·8 per cent is found in the agricultural products of all the magnificent farms irrigated by it in the neighbourhood of the city. When the use of water for removing house refuse is excluded, and ordure and urine are removed as manure in their natural state, their utilization is possible, and is made a source of revenue in such towns as Stuttgart, Groningen, Greifswald, &c. But the systems of this class which are in use have all their disadvantages, as is proved by the tendency which municipal authorities constantly show to adopt the water carriage system. The greatest disadvantage under which these systems labour is the difficulty caused by the offensiveness to sight and smell of the material with which they have to deal. This has been entirely met by the use of moss litter as an absorbent, deodorizer, and disinfectant.

## MOSS MANURE.

The first public mention of the usefulness of moss litter as a deodorizer and absorbent seems to have been made by Dr. Ludwig Happe, in Braunschweig, in December 1880, since which time its application for the purpose has gradually increased until now, when the system has been introduced into several towns in Germany, and is also practised in Congleton, Cheshire, England. In Canada this method of deodorizing human refuse has been in use for years at Caledonia Springs. It, of course at once recalls the dry earth system regarding which great expectations were at one time entertained. The advantages of moss litter over dry earth for the purposes in question are, however, very decided. They consist in the perfect inoffensiveness of the moss litter product, in the fact that one part of moss litter will deodorize and dry at least six parts of mixed excreta, and in the greater agricultural value of the resulting manure. Dry earth (which is required in quantity at least equal to that of the excreta) is valueless from an agricultural point of view, but this is not the case with moss litter, which, as its analyses show, often contains as much nitrogen as ordinary barn-yard manure. Numerous analyses have been made of moss litter manure as produced in Germany, and its average contents from seven different towns may here be stated.

| | p. cent. | lbs. per ton. | | Value per ton. |
|---|---|---|---|---|
| Nitrogen | 0·644 | 13·28 | at 13c. | $1 72 |
| Phosphoric acid | 0·350 | 7·00 | 5 | 0 35 |
| Potash | 0·285 | 5·70 | 5¼ | 0 30 |
| Water | 83·00 | | | $2 37 |

Numerous trials have been made on various crops with this manure, and very satisfactory results are always reported. In all cases it is stated to excel barn-yard manure even when the latter is used in much greater quantity.

In a paper read before the Royal Society of Canada, on May 27, 1902, Mr. T. Macfarlane describes a manner of applying the moss litter, by means of which the quantity used is much reduced, and the value of the resulting manure greatly increased.

Canada possesses in its bogs and swamps inexhaustible quantities of moss litter, which is frequently found in beds several feet in thickness lying above the peat. The following tests have been made in the Inland Revenue Laboratory of moss litter from various localities in the Dominion :—

| —— | Moisture. | Ash. | Nitrogen. |
|---|---|---|---|
| | Per cent. | Per cent. | Per cent. |
| Moss litter, Berwick, N.S. | 14·40 | 1·16 | 1·26 |
| Black muck “ | 13·30 | 3·68 | 1·58 |
| Moss from Great Village, N.S. | 63·44 | 3·46 | 0·63 |
| Sphagnum moss from Shippegan, N.B. | 12·45 | 1·55 | 0·55 |
| Light coloured moss litter from Lincoln Parish, N.B | 11·55 | 1·40 | 1·79 |
| Dark coloured sample from the foregoing locality | 10·95 | 0·80 | 1·06 |
| Moss litter from Musquash, N.B., upper layer | 11·50 | 0·95 | 0·82 |
| Moss litter from same locality, lower layer | 12·50 | 0·90 | 0·72 |
| Peat from St. Bridget, Province of Quebec | 13·30 | 2·50 | 1·48 |
| Peat from St. Hubert, Quebec | 12·35 | 2·68 | 1·84 |
| Light coloured moss litter from Caledonia Springs | 10·00 | 1·60 | 2·95 |
| Dark coloured moss litter from same locality | 11·60 | 2·70 | 2·28 |
| Peat from the same locality | 10·05 | 3·90 | 2·94 |
| Surface moss from the Mer Bleu at Eastman's | 10·85 | 2·80 | 0·71 |
| Surface moss from the Mer Bleu at Baldwin's Farm | 7·90 | 2·66 | 1·47 |
| Surface moss from the Mer Bleu at Baldwin's Farm, 18 inches deep | 27·90 | 1·72 | 1·64 |
| Peat from Mer Bleu at McFadden's Farm, wide ditch, Navan | 22·60 | 4·40 | 2·21 |
| Peat from Mer Bleu, McFadden's Farm, narrow ditch, Navan | 9·40 | 6·62 | 2·80 |
| Peat from near Stratford, Ont | 16·80 | 9·10 | 1·91 |
| Hypnum moss from near Stratford, Ont. | 8·75 | 9·72 | 2·01 |
| Moss littter from bog in Welland County, Ont | 3·85 | 4·70 | 1·51 |
| Peat lying underneath the foregoing | 5·30 | 4·85 | 1·41 |
| Peat from the same locality, lying 4½ feet below surface | 3·25 | 41·25 | 1·52 |
| Peat from Dobson's bog, near Beaverton, Ont | 18·42 | 9·04 | 1·89 |

The manufacture of moss-litter has been attempted at Musquash, in New Brunswick, and it is now being produced in Welland county, Ontario. From the latter locality I was supplied with several bales of the moss litter for experimental purposes, and Dr. Laberge, of Montreal, undertook to superintend the carrying out of an experiment to determine its deodorizing and absorbent qualities. He reports that 100 lbs. of moss litter were sufficient for drying 800 lbs. of ordinary excreta from privy pits in Montreal, and rendering it entirely inoffensive. A sample of the product remained for days in my office without attracting notice and, indeed, it was quite devoid of odour. Its analysis gave the following results:—

| | p. c. | Lbs. per ton. | | Value per ton. |
|---|---|---|---|---|
| Nitrogen | 1·31 | 26·2 | at 13c. | $3 41 |
| Phosphoric acid | 0·90 | 18·0 | " 5 | 0 90 |
| Potash | 0·14 | 2·8 | " 5¼ | 0 15 |
| Water | 65·47 | | | $4 46 |

The valuation of ordinary fresh barn-yard manure with 75 per cent of water is about $2 per ton; with 67 per cent water as in the case of the average given above by Dr. Gossmann, the value is nearly $2.25. Therefore, much better results might be expected agriculturally from a "moss manure" of the composition just described.

Moss litter might also be applied with great advantage in public urinals. When a sample of it was supersaturated with urine and dried, and this process repeated several times, no offensive odours were developed and the product was found on analysis to contain 12·41 per cent of nitrogen, which is equal to a valuation of $32.26 per ton.

These facts are reported in order to show that Canada possesses in her waste lands abundance of material which might be used in our towns and villages for the production of a very valuable manure, with the simultaneous introduction of very many sanitary advantages. It is not to be expected that cities or towns which are advantageously situated for the water carriage system, or which have already adopted it, will make any changes, but there are many towns and villages in the Dominion where the application of the moss litter system would be very suitable, and the authorities of which, by selling the product or giving it gratis to the farmers of the neighbourhood, might confer a great benefit on agriculture.

## APPENDIX F.

## BULLETIN No. 87.--CANNED VEGETABLES.

OTTAWA, July 15, 1903.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—I have to transmit herewith enclosed, a report by Mr. McGill on the samples of Canned Vegetables which were collected in accordance with your instructions of March 27 last. The report is accompanied by a tabulated statement which describes the origin of the samples and the results obtained in their examination.

I have the honour to be, sir,
Your obedient servant,
THOMAS MACFARLANE,
*Chief Analyst.*

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OTTAWA, July 14, 1903.

THOS. MACFARLANE, Esq., F.R.S.C., &c.,
Chief Analyst, Inland Revenue Department.

SIR,—I have the honour to hand you herewith a detailed statement of the analysis of 100 samples of canned vegetables. These may be classified as follows:—

| | Samples. |
|---|---|
| Canned peas | 27 |
| " corn | 28 |
| " tomatoes | 14 |
| " beans | 20 |
| " carrots | 1 |
| " beets | 3 |
| " cabbage | 1 |
| " asparagus | 1 |
| " mushrooms | 1 |
| " pumpkin | 2 |
| " squash | 2 |
| | 100 |

All of these samples were examined for chemical preservatives, but no substances of this nature were detected.

With two exceptions, all the samples were found to be in good condition. The exceptions were samples of corn, one of them (No. 21290) being but slightly decomposed, the other (No. 23135) being quite rotten and offensive.

In addition to the examination just indicated, the samples of peas were submitted to a test for copper.

Copper is stated to be normally present, in traces, in some peas. (Bull. 13, part 8, Department of Agriculture, Washington, 1893). I have determined the degree of accuracy obtainable by the method I used [electrolytic deposition on platinum (sulphuric acidulation) and subsequent solution and colorimetric valuation of the separated copper] and find that less than 10 parts per million can easily be detected, although the quantitative statement of less amounts than this must be accepted with caution, and is best denoted as 'traces'.

Such traces have been found in two samples, No. 17862 and 21716. I have no evidence to show that these traces mean any intentional addition of copper for purposes of intensifying colour. A sample of French peas gave 60 parts of copper per million.

I may add that the question of the wholesomeness of peas greened with copper, is yet unsettled, but the general weight of opinion in English-speaking countries is adverse to the practice.

I have the honour to be, sir,

Your obedient servant,

A. McGILL.

TABLE I.—Analysis of 100 Samples of

| Date of Collection. | Nature of Sample. | Number of Sample. | Name and Address of Vendor. | Quantity. | Cost. |
|---|---|---|---|---|---|
| 1903. | | | *District of Halifax.* | | $ cts. |
| April 16 | Canned pumpkins | 20239 | F. H. Barteau, Yarmouth | 3 bots. | 0 30 |
| " 18 | " peas | 20246 | T. L. Harvey, Wolfville. | 3 " | 0 30 |
| " 18 | " string beans | 20248 | W. T. Stephens, Wolfville | 3 " | 0 30 |
| " 18 | " corn | 20249 | " " | 3 " | 0 30 |
| " 20 | " tomatoes. | 20252 | Murphy & Demont, Windsor, N.S | 3 " | 0 30 |
| " 20 | Wax beans | 20259 | Wentworth Stores, Ltd., Windsor | 3 " | 0 30 |
| " 20 | Canned squash | 20260 | " " | 3 " | 0 30 |
| " 22 | " corn | 20301 | J. H. Kent, Truro | 3 " | 0 30 |
| " 22 | " peas | 20302 | " " | 3 " | 0 30 |
| " 22 | " peas | 20306 | Brown & Graham, Halifax | 3 " | 0 30 |
| " 17 | Green peas | 4320 | Geo. Rackham. Charlottetown | 3 " | 0 30 |
| " 17 | Refugee beans | 4322 | L. MacNutt, Charlottetown | 3 " | 0 20 |
| " 20 | Wax beans | 4332 | Brace, McKay & Co., Charlottetown | 3 " | 0 60 |
| " 22 | Canned tomatoes | 4336 | McDonald & Westang, Georgetown | 3 " | 0 30 |
| | | | *District of New Brunswick.* | | |
| April 13 | Canned corn | 17861 | J. G. Lake, Union St., St. John | 3 bots. | 0 30 |
| " 13 | " peas | 17862 | W. H. Dobson, 24 Waterloo St., St. John | 3 " | 0 30 |
| " 14 | String beans | 17872 | Baird & Peters, Ward St., St. John | 3 " | 0 66 |
| " 16 | Tomatoes | 17879 | Sussex Mercantile Co., Main St., Sussex | 3 " | 0 36 |
| " 16 | Sliced sugar beets | 17880 | King, Ashbell & Co., Broad St., Sussex | 3 " | 0 30 |
| " 16 | Canned tomatoes. | 17882 | J. A. Humphrey, Maple Ave., Sussex | 3 " | 0 45 |
| " 18 | " pumpkins. | 17895 | G. M. & A. A. Banker, 287 Main St., Moncton. | 3 " | 0 25 |
| " 23 | Rhubarb squash | 17908 | John Graham. Queen St., Woodstock | 3 " | 0 30 |
| " 23 | Sugar corn | 17910 | E. M. Campbell, Main St., Woodstock | 3 " | 0 30 |
| " 25 | Sugar peas | 17915 | W. A. Estabrook. Fredericton | 3 " | 0 27 |
| | | | *District of Quebec.* | | |
| April 16 | Canned tomatoes | 23340 | C. Peloquin, St. Hyacinthe | 3 cans. | 0 37 |
| " 20 | " peas | 23346 | H. Bisaillon, St. Lambert | 3 " | 0 25 |
| " 22 | " peas | 23364 | R. E. Kelly | 3 " | 0 30 |
| " 23 | " corn | 23366 | H. Deslauriers, Lachine | 3 " | 0 30 |
| " 23 | " corn | 23368 | T. J. Ibynnes, Lachine | 3 " | 0 45 |
| " 29 | " corn | 23379 | Ronald Piette, Berthierville | 3 " | 0 30 |
| May 1 | " tomatoes | 23393 | Victor Gervais, St. Hyacinthe | 3 " | 0 45 |
| " 1 | " peas | 23396 | Jos. Leduc, St. Hyacinthe | 3 " | 0 30 |
| " 14 | " peas | 23398 | P. C. Lemoine, Sorel. | 3 " | 0 25 |
| " 14 | Pork and beans | 23399 | " " | 3 " | 0 15 |
| " 14 | Canned peas | 23601 | J. O. Fagnan | 3 " | 0 25 |
| | | | *District of Montreal.* | | |
| May 28 | Canned corn | 21285 | A. Archambault, 2,045 St. James St., St. Henri | 3 cans. | 0 25 |
| " 28 | " corn | 21286 | F. Forest, 210 St. James St., St. Henri | 3 " | 0 25 |
| " 28 | " beans | 21287 | " " " | 3 " | 0 25 |
| " 28 | Green peas | 21288 | " " " | 3 " | 0 25 |
| April 29 | Canned tomatoes | 21289 | A. Laing, 2,023 Notre Dame Street, Montreal | 3 " | 0 38 |
| May 8 | " corn | 21290 | E. Limoges, 1,949 Notre Dame Street, Montreal. | 3 " | 0 27 |
| " 14 | " corn | 21291 | E. H. Montpetit, 227 Richelieu Street, St. Cunigonde | 3 " | 0 25 |
| " 14 | Green peas | 21292 | " " " " | 3 " | 0 30 |
| " 14 | Butter beans | 21293 | " " " " | 3 " | 0 25 |
| " 14 | Canned corn | 21294 | W. J. Maloney, 468 St. Antoine Street, St. Cunigonde | 3 " | 0 30 |

Canned Vegetables as sold in 1903.

| Name and Address of Manufacturer or Furnisher as given by Vendor. | Name of Brand. | Preservatives. | Remarks. |
|---|---|---|---|
| Simcoe Canning Co., Simcoe, Ont. | | None | Good. |
| A. C. Miller, Picton, Ont | | " | No copper—well preserved. |
| W. L. Boulter & Sons, Picton, Ont. | | " | Good. |
| A. B. Saylor, Bloomfield, Ont | | " | " |
| A. C. Miller, Picton, Ont | | " | " |
| Simcoe Canning Co. | | " | " |
| D. W. Hoegg & Co., Fredericton. | | " | " |
| A. C. Miller, Picton, Ont | | " | " |
| " " | Little Chief | " | No copper—well preserved. |
| Simcoe Canning Co., Simcoe, Ont. | | " | " " |
| | Lion | " | " " |
| | | " | Good. |
| | | " | " |
| | | " | " |
| | | | |
| D. W. Hoegg & Co., Fredericton. | | None | Good. |
| Maritime Pure Food Co | St. John Valley. | " | Traces of copper—well preserved. |
| A. B. Saylor, Bloomfield | | " | Good. |
| Reynard & Co., Baltimore | Fox brand | " | " |
| Simcoe Canning Co., Simcoe, Ont. | | " | " |
| Bloomfield Canning Co | | " | " |
| Delhi Fruit and Canning Co | 'Maple Leaf' | " | " |
| D. W. Hoegg & Co., Fredericton. | 'Dominion' | " | " |
| " " " | " | " | " |
| Bloomfield Canning Co | Quaker brand | " | No copper—well preserved. |
| | | | |
| Vendor | | None | Good. |
| Simcoe Canning Co. | Lynn Valley | " | No copper—well preserved. |
| A. C. Miller, Picton, Ont | | " | " " |
| Miller & Co., Trenton | | " | Good. |
| Martin Laporte & Co., Montreal | | " | " |
| A. C. Miller & Co., Picton | | " | " |
| Simcoe Canning Co | | " | " |
| Delhi Fruit and Canning Co | Maple Leaf | " | No copper—well preserved. |
| A. C. Miller & Co., Picton, Ont | | " | " " |
| W. Clark, Montreal | | " | Good. |
| Brighton Canning Co | | " | No copper—well preserved. |
| | | | |
| | Queen brand | None | Good. |
| | Union brand | " | " |
| | 'Red Cross' | " | " |
| | 'Maple Leaf' | " | No copper—well preserved. |
| | Victoria brand | " | Good. |
| | Star brand | " | Slightly decomposed. |
| | | | |
| | Union brand | " | Good. |
| Lynn Valley | | " | No copper—well preserved. |
| Lake Port Preserving Co | | " | Good. |
| | | | |
| | 'Canada First' | " | Good. |

TABLE I.—Analysis of 100 Samples of

| Date of Collection. | | Nature of Sample. | Number of Sample. | Name and Address of Vendor. | Quantity. | Cost. |
|---|---|---|---|---|---|---|
| 1903. | | | | *District of Kingston.* | | $ cts. |
| April | 20 | Canned wax beans | 23131 | R. T. Hamly, Walton Street, Port Hope | 3 cans. | 0 21 |
| " | 20 | " tomatoes | 23132 | S. Fourt, " " | 3 " | 0 38 |
| " | 20 | " corn | 23133 | " " " | 3 " | 0 25 |
| " | 20 | " sugar corn | 23126 | W. H. Hamilton, Peterboro' | 3 " | 0 25 |
| " | 20 | Green peas | 23127 | " " | 3 " | 0 25 |
| " | 29 | Canned peas | 23128 | E. Brown & Co., Peterboro' | 3 " | 0 38 |
| " | 20 | " peas | 23129 | " " | 3 " | 0 38 |
| " | 20 | " corn | 23130 | " " | 3 " | 0 25 |
| " | 20 | " corn | 23135 | Ottawa | ...... | ...... |
| | | | | *District of Toronto.* | | |
| April | 15 | Canned corn | 23411 | Chas. Chown, 575 Yonge Street, Toronto | 3 " | 0 25 |
| " | 15 | Green peas | 23412 | " " " | 3 " | 0 25 |
| " | 15 | Canned beans | 23413 | R. English, 490 Yonge Street, Toronto | 3 " | 0 25 |
| " | 15 | Sweet peas | 23414 | F. Patience, 427 Yonge Street, Toronto | 3 " | 0 25 |
| " | 15 | Canned corn | 23415 | " " " | 3 " | 0 23 |
| " | 16 | " corn | 23416 | J. M. Bothwell, Dunlop Street, Barrie | 3 " | 0 30 |
| " | 16 | String beans | 23417 | " " " | 3 " | 0 30 |
| " | 16 | Wax beans | 23418 | James Vair, Dunlop Street, Barrie | 3 " | 0 30 |
| " | 16 | Green peas | 23419 | " " " | 3 " | 0 30 |
| " | 16 | Canned tomatoes | 23420 | " " " | 3 " | 0 45 |
| | | | | *District of Windsor.* | | |
| April | 13 | Golden wax beans | 22049 | E. O'Flaherty, Stratford | 3 " | 0 30 |
| " | 15 | Canned beans | 22056 | B. B. Gunn, Seaforth | 3 " | 0 25 |
| " | 15 | " peas | 22057 | " " | 3 " | 0 30 |
| " | 15 | " corn | 22058 | " " | 3 " | 0 30 |
| " | 16 | " peas | 22070 | A. K. Roesch, Waterloo | 3 " | 0 25 |
| " | 18 | " corn | 22078 | Peter Anderson, Guelph | 3 " | 0 30 |
| " | 18 | " beans | 22079 | Jackson & Son, Guelph | 3 " | 0 30 |
| " | 22 | " corn | 22090 | H. Malcomson, Chatham | 3 " | 0 25 |
| " | 23 | " tomatoes | 22096 | James Wilson, London | 3 " | 0 45 |
| " | 23 | " tomatoes | 22099 | Scanchett Bros., London | 3 " | 0 45 |
| | | | | *District of Winnipeg.* | | |
| April | 15 | Canned corn | 17429 | Jas. Blair Co., Morden | ...... | 0 30 |
| " | 16 | Buttered beans | 17433 | R. Cross Co., Limited, Killarney | ... | 0 40 |
| " | 18 | Canned peas | 17439 | Huuter, Moore & Aikens, Boissevain | .... | 0 40 |
| " | 18 | " corn | 17440 | F. G. Fox, Boissevain | ... | 0 40 |
| " | 21 | " tomatoes | 17443 | McLellan & English, Virden | 3 cans. | 0 60 |
| " | 24 | " carrots | 17452 | Smith & Burton, Brandon | 3 " | 0 45 |
| " | 24 | Sugar beets | 17451 | J. P. Murray & Co., Brandon | 3 " | 0 45 |
| " | 24 | Canned cabbage | 17453 | Smith & Burton, Brandon | 3 " | 0 45 |
| " | 25 | " asparagus | 17460 | T. A. Newman Bros., Portage la Prairie | 3 " | 1 05 |
| May | 6 | Mushrooms | 17465 | J. A. McKercher, Winnipeg | 3 " | 0 75 |
| | | | | *District of Manitoba.* | | |
| April | 21 | Canned corn | 21712 | Smith & Gaetz, Red Deer | 3 cans. | 0 45 |
| " | 23 | Green peas | 21716 | Compton & Montgomery, Wetaskiwin | 3 " | 0 40 |
| " | 24 | Baked beans | 21721 | J. Whitlaw, Edmonton | 3 " | 0 45 |
| " | 25 | Tomatoes | 21723 | Douglas Bros., Edmonton | 3 " | 0 50 |
| " | 29 | String beans | 21730 | Copas & Emerson, Strathcona | 3 " | 0 40 |

Canned Vegetables as Sold in 1903.—*Continued.*

| Name and Address of Manufacturer or Furnisher as given by Vendor. | Name of Brand. | Preservatives. | Remarks. |
|---|---|---|---|
| | 'Log Cabin' | None | Good. |
| | 'White Rose' | " | " |
| | " | " | " |
| | Queen brand | " | " |
| | 'Little Chief' | " | No copper—well preserved. |
| | 'Extra Faultless' | " | " " |
| | Epicure brand | " | " " |
| | 'Log Cabin' | " | " " |
| Brighton Canning Co. | Thistle | " | Much decayed. |
| | | | |
| | 'Favorite brand' | " | Good. |
| | 'Advance Sweet' | " | No copper—well preserved. |
| | Thistle brand | " | Good. |
| Strathroy Packing Co. | | " | No copper—well preserved. |
| | 'Maple Leaf' | " | Good. |
| | 'Red Cross' | " | " |
| | Quaker brand | " | " |
| | 'Blue Bell' | " | " |
| | Kitchner brand | " | No copper—well preserved. |
| | Morton brand | " | Good. |
| | | | |
| Oshawa Canning Co. | | " | Good. |
| Aylmer Canning Co. | Standard | " | Well preserved. |
| Vendor | | " | No copper—well preserved. |
| Oshawa Canning Co. | | " | Good. |
| Randal & Roose, Berlin | | " | No copper—well preserved. |
| Aylmer Canning Co. | | " | Good. |
| Oshawa Canning Co. | | " | " |
| Kent Canning Co | | " | " |
| Bloomfield Canning Co. | Quaker brand | " | " |
| Indiana Packing Co. | | " | " |
| | | | |
| Lalor Canning Co. | | None | Good. |
| Delhi Fruit and Canning Co. | | " | " |
| Strathroy Canning Co. | Middlesex | " | No copper—well preserved. |
| Kent Canning Co | | " | Good. |
| Balfour & Co., Hamilton | | " | " |
| Simcoe Canning Co. | | " | " |
| Lake Port Preserving Co. | | " | " |
| Simcoe Canning Co. | | " | " |
| Hickwith Asparagus Canning Co. | | " | " |
| Dandrealle & Gaudin, Bordeaux, France | | " | " |
| | | | |
| W. Boulter & Son, Picton, Ont. | | None | Good. |
| Perth Canning Co. | Royal Standard. | " | Traces of copper—well preserved |
| " " | | " | Good. |
| Aylmer Canning Co. | | " | " |
| A. B. Saylor, Bloomfield, Ont | | " | " |

## Table I.—Analysis of 100 Samples of

| Date of Collection. | Nature of Sample. | Number of Sample. | Name and Address of Vendor. | Quantity. | Cost |
|---|---|---|---|---|---|
| 1903. | | | *District of British Columbia.* | | $ cts. |
| April 16 | Canned peas | 21691 | Coulter & Berry, Langley, B.C | .... | 0 55 |
| " 18 | " beans | 23509 | Harrison River Mills Timber and Trading Co., British Columbia | 3 cans. | 0 60 |
| " 18 | " tomatoes | 23512 | M. Desbrisay, Mission, B.C | 2 " | 0 30 |
| " 18 | " corn | 23515 | J. Plumridge, Mission, B.C | 2 " | 0 25 |
| " 18 | " peas | 23518 | S. Petersky, Steveston, B.C | 2 " | 0 25 |
| " 18 | " corn | 23519 | " " | 2 " | 0 25 |
| " 18 | " corn | 23541 | S. Greenhalgh, Victoria, B.C | 3 " | 0 45 |
| " 18 | " beets | 23545 | J. R. Jackson, Vancouver | 3 " | 0 45 |
| " 18 | " beans | 23546 | Foran Bros., Vancouver | 3 " | 0 30 |
| " 18 | " peas | 23551 | W. P. Pemville, Vancouver | 3 " | 0 40 |
| " 18 | " peas | special | ........ | ...... | ..... |

Canned Vegetables as Sold in 1903.—*Concluded.*

| Name and Address of Manufacturer or Furnisher as given by Vendor. | Name of Brand. | Preservatives. | Remarks. |
|---|---|---|---|
| Bloomfield Canning Co. | | None | No copper—well preserved. |
| Brighton Canning Co | | " | Good. |
| San Bernard Packing Co | | " | " |
| Kent Canning Co., Chatham, Ont. | | " | " |
| Oshawa Canning Co. | Blue Bell | " | No copper—well preserved. |
| Strathroy Canning Co | | " | Good. |
| Newton Canning Co. | | " | " |
| Lion Gate Packing Co., Simcoe | | " | " |
| L. M. Schench & Co., St. Catharines | | " | " |
| Balfour & Co., Hamilton | Tartan | " | No copper—well preserved. |
| French manufacture | | " | Copper—60 parts metallic copper per million (=0·006 per cent)—well preserved. |

## APPENDIX G.

# BULLETIN No. 88.--PARIS GREEN, 1902-3.

OTTAWA, July 31, 1903.

W. J. GERALD, Esq.,
Deputy Minister of Inland Revenue.

SIR,—I have to submit herewith a tabulated statement descriptive of the samples of Paris Green which were collected in accordance with your instructions of March 27 last, and also of a smaller collection of the same article made previously, the particulars of which were reported to you on October 27, 1902, but have not yet been published. Taking both collections, the number of samples submitted to examination was as follows:—

| | |
|---|---|
| In Prince Edward Island | 8 |
| Nova Scotia | 18 |
| New Brunswick | 18 |
| St. Hyacinthe District | 18 |
| Montreal " | 18 |
| Kingston " | 18 |
| Toronto " | 16 |
| London " | 17 |
| Manitoba and N. W. Territories | 20 |
| British Columbia | 18 |
| Total | 169 |

Of this total the number of samples pronounced to be adulterated, or challenged for other defects, was as follows:—

| | Adulterated. | Challenged. |
|---|---|---|
| From Prince Edward Island | 2 | 0 |
| St. Hyacinthe District | 1 | 1 |
| Montreal District | 1 | 0 |
| Toronto " | 0 | 2 |
| | 4 | 3 |

Discarding all the samples to which objection has been taken (7 out of 169) the percentage of genuine is 95·8. From this result it seems that an improvement has been taking place during the last ten years in the quality of Paris green sold in the Dominion. The averages of pure samples in the various collections made are given in the following memorandum :—

| | |
|---|---|
| 1894 | 72·2 p.c. genuine |
| 1895 | 89·1 p.c. ″ |
| 1902–3 | 95·8 p.c. ″ |

I have the honour to be, sir,
Your obedient servant,

THOMAS MACFARLANE,
*Chief Analyst.*

RESULTS of examining 169 Samples of

| Date of Collection. | No. of Sample. | Name and Address of Vendor. | Quantity. | Cost. | Name and Address of Manufacturer or Furnisher as given by Vendor. |
|---|---|---|---|---|---|
| 1902 | | *District of Halifax.* | | $ cts. | |
| July 31 | 4311 | Finnell and Chandler, Charlottetown, P.E.I | ...... | .... | Lewis Berger & Sons........ |
| " 31 | 4312 | Cawell Bros., Charlottetown, P.E.I.... | ...... | ...... | "Lion Brand". |
| Aug. 6 | 20226 | T. P. Collins, Kentville, N.S | ........ | ..... | Canada Paint Co., Montreal, Que. |
| " 11 | 20231 | J. R. Rawley, Halifax, N.S.. | ........ | ..... | A. B. Ansbacher, New York.... |
| July 23 | 17844 | A.C. Smith & Co., St. John, N.B..... | ........ | ..... | J. Pfeiffer, New York, N.Y..... |
| " 23 | 17845 | George A. Moore, St. John, N.B ..... | ........ | ...... | Canada Paint Co., Montreal..... |
| " 21 | 23331 | J. E. Marceau et Frère, Lac Mégantic, Quebec........ | ........ | ..... | " " ... |
| " [illegible] | 23337 | S. Bourgeois, St. Hyacinthe, Que. | ........ | ...... | Lewis Berger & Sons, London, Eng |
| " 22 | 21222 | Palascio Hardware Co., 1901, Notre Dame St., Montreal.......... | ........ | ...... | Canada Paint Co., Montreal..... |
| " 22 | 21223 | L. Lafleur, 1932 Notre Dame St., Montreal.......... | ........ | ...... | A. B. Ansbacher, New York.... |
| " 23 | 21227 | John Corbett, Princess St., Kingston... | ........ | .... | L. Pfeiffer, New York .......... |
| " 23 | 21228 | W. A. Mitchell, Princess St., Kingston | ........ | ..... | Canada Paint Co., Montreal..... |
| " 21 | 22035 | C. E. Nasmith, Stratford, Ont......... | ........ | ..... | ........................ |
| " 22 | 22036 | W. D. Rougoic, Goderich, Ont......... | ........ | ...... | Saunders & Pearcy, Toronto.... |
| " 31 | 17423 | W. Wyatt, Winnipeg, Man .... | ........ | ...... | John Lucas & Co., New York.... |
| " 31 | 17425 | Campbell & Son, " | ........ | ...... | P. B. Dodd & Co., Montreal. ... |
| " 28 | 21680 | C. Nelson, Vancouver, B.C............ | ........ | ...... | A. B. Ansbacher, New York.... |
| " 28 | 21681 | E. S. Knowlton, Vancouver, B.C... | ........ | .. | J. Pfeiffer, New York..... .... |
| ........ | Special. | Cawell Bros., Charlottetown, P.E.I.... | ........ | | Sent by Vendors............... |
| 1903 | | *District of Halifax.* | | | |
| April 16 | 20241 | C. C. Richards, Yarmouth, N.S........ | 3 bots.. | 0 45 | Canada Paint Co., Montreal..... |
| " 20 | 20262 | R. B. [illegible]akin, Windsor, N.S........... | 3 " .. | 0 25 | " " ..... |
| " 21 | 20265 | Duriock & Armstrong, Windsor ....... | 3 " .. | 0 20 | Lewis Berger & Sons, London, Eng |
| " 21 | 20266 | Wilcox Bros., Windsor, N.S........... | 3 " .. | 0 25 | " " |
| " 22 | 20304 | Crowe Bros., Truro, N.S............... | 3 " .. | 0 25 | " " |
| " 28 | 20314 | Hattie & Mylins, Halifax, N.S......... | 1 lb.... | 0 30 | Canada Paint Co., Montreal..... |
| " 28 | 20315 | Black Bros., Halifax................ | 1 " .... | 0 20 | " " |
| " 28 | 20316 | A. M. Bell, Halifax..... .......... | 1 " .. . | 0 20 | A. B. Ansbacher & Co., Chicago. |
| " 30 | 20320 | Crowell Bros., Halifax...... ....... | 1 " .... | 0 20 | " " |
| " 30 | 20321 | C. E. Huggins, Halifax............... | 1 " .... | 0 20 | Simson Bros., Halifax. ......... |
| " 30 | 20323 | R. McFatridge, Halifax.............. | 1 " .. | 0 25 | Canada Paint Co., Montreal..... |
| " 30 | 20326 | W. H. Stevens, Dartmouth .... .... | 3 pkgs. | 0 30 | Hattie & Mylius, Halifax........ |
| " 30 | 20329 | Jas. Simmonds & Co., Dartmouth...... | 3 " | 0 25 | Canada Paint Co., Montreal..... |
| May 1 | 20331 | G. H. Colwell, Halifax...... ........ | 3 " | 0 40 | Brown & Webb, Halifax....... |
| " 1 | 20332 | H. A. Taylor, Halfax...... ....... | 3 " | 0 30 | Canada Paint Co., Montreal..... |
| " 1 | 20334 | Simson Bros., Halifax................ | 3 " | 0 25 | " " ..... |
| April 20 | 4329 | R. I. Holman, Summerside ........... | 3 cans.. | 0 [illegible] | ........................ |
| " 20 | 4330 | F. W. Strong, Summerside............ | 3 " . | 0 60 | ........................ |
| " 21 | 4333 | S. W. Crabbe, Charlottetown.......... | 3 " .. | 0 54 | ........................ |
| " 22 | 4335 | D. Gordon, Georgetown.......... ..... | 3 " .. | 0 66 | ........................ |
| " 22 | 4337 | John Knight, Georgetown.... ....... | 3 " .. | 0 60 | ........................ |
| | | *District of New Brunswick.* | | | |
| " 13 | 17864 | P. Nase & Son, Main St., St. John .... | 3 cans. | 0 75 | Canada Paint Co., Montreal..... |
| " 13 | 17865 | McMulkin & Jordan, Main St., St. John | 3 " . | 0 75 | J. Pfeiffer, New York..... ... |
| " 14 | 17866 | George A. Moore, 109 Brussel St., St. John. | 3 " . | 0 75 | " " ........ |

Paris Green as sold in 1902–3.

| Results of Analysis. | | | | | Name of Analyst and Remarks. | No. of Sample. |
|---|---|---|---|---|---|---|
| Cupric Oxide. | Arsenious Acid. | Acetic Anhydride. | Moisture. | Solubility in Ammonia. | | |
| p.c. | p.c. | | p.c. | | | |
| 29·00 | 51·32 | Undetermined. | | | Genuine | 4311 |
| 7·00 | 20·20 | " | | Much residue | Adulterated contains 60·4 p.c. of barium and green coloring matter soluble in methy-alcohol | 4312 |
| 29·81 | 54·30 | " | | | Genuine | 20226 |
| 30·50 | 53·60 | " | | | " | 20231 |
| 30·40 | 53·00 | " | | | " | 17844 |
| 30·50 | 55·89 | " | | | " | 17845 |
| 30·20 | 50·48 | " | | | " | 23331 |
| 30·40 | 50·61 | " | | | " | 23337 |
| 30·06 | 51·88 | " | | | " | 21222 |
| 29·70 | 54·00 | " | | | " | 21223 |
| 31·15 | 51·42 | " | | | " | 21227 |
| 30·20 | 52·50 | " | | | " | 21228 |
| 31·90 | 53·50 | " | | | " | 22033 |
| 31·50 | 54·20 | " | | | " | 22036 |
| 30·20 | 54·79 | " | | | " | 17423 |
| 31·80 | 57·62 | " | | | " | 17425 |
| 31·00 | 56·92 | " | | | " | 21680 |
| 30·40 | 54·81 | " | | | " | 21681 |
| 30·80 | 52·39 | " | | | " | Special. |
| 31·02 | 55·56 | " | 1·07 | No residue | M. Bowman, unadulterated | 20241 |
| 30·19 | 52·57 | " | 2·01 | | " " | 20262 |
| 31·95 | 54·17 | " | 1·16 | | " " | 20265 |
| 31·73 | 53·54 | " | 1·16 | | " " | 20266 |
| 31·88 | 53·64 | " | 1·01 | | " " | 20304 |
| 30·52 | 55·25 | " | 0·87 | No residue | " " | 20314 |
| 30·74 | 53·91 | " | 2·12 | " | " " | 20315 |
| 31·63 | 54·96 | " | 1·48 | " | " " | 20316 |
| 31·46 | 54·35 | " | 1·44 | " | " " | 20320 |
| 31·07 | 55·10 | " | 1·31 | " | " " | 20321 |
| 31·07 | 53·61 | " | 1·23 | " | " " | 20323 |
| 30·53 | 54·77 | " | 1·23 | " | " " | 20326 |
| 31·15 | 54·16 | " | 2·29 | " | " " | 20329 |
| 32·38 | 54·44 | " | 1·09 | " | " " | 20331 |
| 31·55 | 54·41 | " | 1·31 | " | " " | 20332 |
| 31·57 | 54·43 | " | 1·22 | " | " " | 20334 |
| 32·05 | 55·22 | " | 1·16 | " | " " | 4329 |
| 31·26 | 55·22 | " | 0·95 | " | " " | 4330 |
| undetermined. | undetermined. | " | 0·48 | Large residue of barytes | " adulterated with 65·44 p.c. of barytes and green coloring matter | 4333 |
| 31·75 | 55·03 | " | 1·17 | No residue | M. Bowman, unadulterated | 4335 |
| 30·62 | 53·83 | " | 1·06 | " | " " | 4337 |
| 30·50 | 51·17 | Undetermined. | Undetermined. | Complete | Alph. Lemoine; unadulterated | 17864 |
| 31·30 | 55·13 | " | " | " | " " | 17865 |
| 30·70 | 53·35 | " | " | " | " " | 17866 |

RESULTS of examining 169 Samples of

| Date of Collection. | No. of Sample. | Name and Address of Vendor. | Quantity. | Cost. | Name and Address of Manufacturer or Furnisher as given by Vendor. |
|---|---|---|---|---|---|
| 1903. | | *District of New Brunswick*—*Con.* | | $ cts. | |
| April 15 | 17873 | W. H. Thorne Co., Ltd., St. John..... | 3 " . | 0 45 | Canada Paint Co., Montreal..... |
| " 15 | 17874 | T. B. Barker & Sons, 57-59 Dock St., St. John. | 3 " . | 0 60 | " " ..... |
| " 16 | 17877 | W. B. MacKay & Co., Main St., Sussex | 3 " . | 0 75 | E. J. Barry, 18 Cliff St., New York |
| " 16 | 17881 | Sussex Mercantile Co., Main St., Sussex | 3 " . | 0 54 | Canada Paint Co., Montreal..... |
| " 17 | 17889 | The Sumner Co., Main and Wesley Sts., Moncton. | 3 " . | 0 75 | J. Pfeiffer, New York...... .... |
| " 17 | 17890 | Robertson & Givan, Main and Duke Sts., Moncton. | 3 " . | 0 66 | Canada Paint Co., Montreal..... |
| " 18 | 17894 | Winter & Co., 282 Main St., Moncton.. | 3 " . | 0 75 | Lewis Berger & Sons, London, Eng. |
| " 21 | 17899 | Fred. E. Rose, King St., St. Stephen.. | 3 " . | 0 75 | J. Pfeiffer, New York.......... |
| " 21 | 17900 | DeWolfe Hardware Co., King St., St. Stephen. | 3 " . | 0 60 | Canada Paint Co., Montreal.... |
| " 23 | 17905 | A. E. Jones, King St., Woodstock .. . | 3 " . | 0 60 | " " ..... |
| " 23 | 17906 | W. F. Diblee & Son, Main St., Woodstock. | 3 " . | 0 60 | " " ..... |
| " 25 | 17917 | Geo. Y. Diblee, Queen St., Fredericton | 3 " . | 0 75 | Lewis Berger & Sons, Eng ..... |
| " 25 | 17919 | Tweedale & Co., Queen St., Fredericton | 3 " . | 0 75 | J. Pfeiffer, New York....... ... |
| | | *District of St. Hyacinthe.* | | | |
| " 17 | 23341 | Raymond et Frères, St. Hyacinthe..... | 1½ lbs.. | 0 30 | Vendors....... ..... .......... |
| " 20 | 23347 | Victor Trudeau, St. Lambert....... . | 10½ oz .. | 0 10 | .. .. ...... . ... .... ... . |
| " 21 | 23351 | A. Bergeron, Iberville, Que ....... ... | 1 lb ... | 0 20 | Lewis Berger & Sons, Eng ...... |
| " 21 | 23354 | Coté et Frères, St. Johns, Que ........ | 1 " ... | 0 25 | Canada Paint Co., Montreal..... |
| " 22 | 23361 | W. Campbell, Lacolle... . ... . .. | 2 lbs.. | 0 40 | Howden Starke & Co., Montreal. |
| " 22 | 23365 | John Hunter, Lacolle.... . .......... | 1 " .. | | A. Ramsay & Son......... .. .. |
| " 23 | 23369 | H. R. Thompson, Ulverton . .. . | 1 lb .. | 0 20 | Canada Paint Co., Montreal .... |
| " 23 | 23367 | A. Allard, Lachine....... .......... | 12 oz ... | 0 15 | Kavanagh & Co., Montreal...... |
| May 1 | 23389 | Thos. Lapointe, Terrebonne...... ... | 1 lb ... | 0 20 | Canada Paint Co., Montreal..... |
| " 13 | 23390 | Simeon Papillan, Notre Dame de St. Hyacinthe. | 1 " ... | 0 25 | Lewis Berger & Sons, Eng ... |
| " 13 | 23392 | Victor Gervais, St. Hyacinthe....... | 1 " ... | 0 25 | Canada Paint Co., Montreal..... |
| " 13 | 23395 | Jos Leduc, St. Hyacinthe......... . | 1 " ... | 0 25 | Lewis Berger & Sons, Eng ...... |
| " 14 | 23397 | P. C. Lemoine, Sorel......... ....... | 1 " ... | 0 25 | .............. ... ..... ...... |
| " 13 | 23400 | J. O. Fagnan, Sorel.... ...... .... | 1 " ... | 0 25 | A. B. Ansbacher & Co ......... |
| " 14 | 23602 | A. C. Trempe, Sorel ................. | ¾ " .. | 0 20 | Canada Paint Co., Montreal..... |
| " 15 | 23603 | J. B. St. Pierre, St. Hyacinthe.. . ... | 1 " ... | 0 25 | L. B. Hibert, Montreal...... .. |
| | | *District of Montreal.* | | | |
| " 8 | 21255 | A. E. Breyent, 1786 St. Catherines St.. | 2 pkgs. | 0 30 | L. Berger & Sons, Eng.. ....... |
| " 8 | 21256 | C. Roussin, 1719 St. Catherines St..... | 1 lb ... | 0 25 | Canada Paint Co., Montreal..... |
| " 8 | 21257 | Wilson, Rousseau & Co., 167 St. Lawrence St. | 1 " ... | 0 25 | " " ..... |
| " 8 | 21258 | E. D. Colleret & Co., 26 St. Lawrence St. | 1 " ... | 0 25 | ......... .................... |
| " 8 | 21259 | A. Beaudoin, St. Lawrence St., Montreal | 1 " ... | 0 25 | B. Ansbacher & Co ............ |
| " 9 | 21260 | Dr. G. Demer, 2185 Notre Dame St.... | 1 " ... | 0 30 | ........ . . ...... .. ........ |
| " 12 | 21261 | L. A. Lambert, 218 St. Paul St., Montreal. | ........ | 0 18 | Lewis Berger & Sons, Eng ..... |

Paris Green as sold in 1902-3—*Continued.*

| Results of Analysis. | | | | | Name of Analyst and Remarks. | No. of Sample. |
|---|---|---|---|---|---|---|
| Cupric Oxide. | Arsenious Acid. | Acetic Anhydride. | Moisture. | Solubility in Ammonia. | | |
| p. c. | p. c. | p. c. | p. c. | | | |
| 30·20 | 52·76 | Undetermined. | Undetermined. | Complete.... | Alph. Lemoine: unadulterated. | 17873 |
| 29·70 | 53·39 | " .. | " .. | " ..... | " " | 17874 |
| 29·60 | 55·07 | " .. | " .. | " | " " .... | 17877 |
| 30·90 | 50·70 | " .. | " .. | Slight residue... | Miss E. Davidson " | 17881 |
| 31·10 | 50·35 | " .. | " .. | " ... | " " | 17889 |
| 31·40 | 50·06 | " .. | " .. | Complete.. | " " | 17890 |
| 31·70 | 53·83 | " .. | " .. | " .. | " " | 17894 |
| 31·00 | 54·20 | " .. | " .. | " .... | Alph. Lemoine " | 17899 |
| 30·70 | 54·26 | " .. | " .. | " ..... | " " | 17900 |
| 29·50 | 53·50 | " .. | " .. | " ..... | " " | 17905 |
| 30·20 | 53·20 | " .. | " .. | " ..... | " " | 17906 |
| 29·70 | 53·60 | " .. | " .. | " ... | " " | 17917 |
| 30·10 | 53·89 | " .. | " .. | " ... | " " .. | 17919 |
| 29·80 | 53·70 | " .. | " .. | " .... | " " ........ | 23341 |
| 30·30 | 52·05 | " .. | " .. | Slight residue .. | Alph. Lemoine; unadulterated, but mixed with small cakes of a mixture of paris green and oxide of iron, the latter evidently derived from a previous containing vessel. | 23347 |
| 31·40 | 54·12 | " .. | " .. | Slight sediment. | Miss E. Davidson; genuine............ | 23351 |
| 30·90 | 54·77 | " .. | " .. | Complete. ..... | " " ........... | 23354 |
| 11·70 | 41·43 | " . | " . | 26·70 p.c. sediment. | Alph. Lemoine; adulterated with barytes. | 23361 |
| 31·00 | 53·87 | " | " .. | Slight sediment. | Miss E. Davidson; genuine.... ... | 23365 |
| 30·00 | 55·17 | " . | " .. | Complete...... | " " ........... | 23369 |
| ...... | ........ | " .. | " .. | Much sediment. | " " ........... | 23367 |
| 29·80 | 54·08 | " .. | .. | Complete.... | " " ........... | 23389 |
| 31·70 | 55·87 | " . | " | " ....... | Alph. Lemoine; unadulterated..... | 23390 |
| 30·90 | 54·39 | " .. | " .. | " ..... | " " ..... | 23392 |
| 30·60 | 54·14 | " | " .. | " ... | " " ...... | 23395 |
| 31·40 | 52·13 | " .. | " .. | " ... | " " ........ | 23397 |
| 29·30 | 53·39 | " .. | " .. | " .... | " " ..... | 23400 |
| 29·50 | 53·02 | " .. | " .. | " .... | " " ....... | 23602 |
| 30·30 | 54·51 | " . | " .. | " .... | " " ....... | 23603 |
| 32·69 | 55·09 | Not determined. | 0·80 | Practically complete. | Dr. J. T. Donald, Montreal; genuine.... | 21255 |
| 32·07 | 52·99 | " .. | 0·76 | " .. | " " ... | 21256 |
| 32·07 | 55·56 | " .. | 0·79 | " .. | " " .... | 21257 |
| 31·80 | 53·80 | " .. | 0·59 | " .. | " " .... | 21258 |
| 31·35 | 54·99 | " . | 0·91 | " .. | " " .... | 21259 |
| 21·60 | 26·79 | " .. | 3·37 | 28·2 p.c. insoluble in ammonia. | Dr. J. T. Donald; contains 10·84 p.c. barytes, also terra alba or plaster of paris = 13·89 p.c.; adulterated with barytes and sulphate of lime. | 21260 |
| 31·00 | 54·28 | " .. | 0·75 | Practically complete. | Dr. J. T. Donald; genuine.......... | 21261 |

RESULTS of Examining 169 Samples of

| Date of Collection. | No. of Sample. | Name and Address of Vendor. | Quantity. | Cost. | Name and Address of Manufacturer or Furnisher as given by Vendor. |
|---|---|---|---|---|---|
| 1903. | | *District of Montreal*—Con. | | $ cts. | |
| May 8 | 21262 | A. A. Wilson, 219 St. Paul St. | 1 lb ... | 0 20 | |
| „ 6 | 21263 | Keddy & Kenny, Hemmingford, Que. | 1 „ ... | 0 20 | Lewis Berger & Sons, Eng |
| „ 6 | 21264 | John McFee, Hemmingford | 1 „ ... | 0 20 | Canada Paint Co., Montreal. |
| „ 6 | 21265 | J. V. Amyrauld, Hemmingford | 1 „ ... | 0 25 | Howden, Starke & Co. |
| „ 7 | 21266 | C. Bisson, St. Vincent de Paul | 1 „ ... | 0 20 | Sherwin-Williams Paint Co., Montreal. |
| „ 7 | 21267 | V. Auclair, St. Vincent de Paul | 1 lb ... | 0 25 | A. Ramsay & Son |
| „ 7 | 21268 | W. P. Brennan, St. Thérèse | 1 „ ... | 0 20 | |
| „ 7 | 21269 | G. L. Meikle & Co., Lachute | 1 „ ... | 0 25 | |
| 7 | 21270 | H. Tracer, jr., Lachute | 1 „ ... | 0 25 | E. J. Barry, New York |
| | | *District of Kingston.* | | | |
| April 21 | 23173 | A. C. Miller, King St., Brockville | 1 lb ... | 0 20 | |
| „ 21 | 23174 | R. H. Stuart, King St., Brockville | 3 pkgs. | 0 30 | Jno. Lucas & Son |
| „ 21 | 23175 | J. Williams, Brockville | 1 lb ... | 0 25 | |
| „ 21 | 23176 | F. R. Curry, King St., Brockville | 1 „ ... | 0 25 | P. D. Woods & Co. |
| „ 21 | 23177 | V. T. Kincard, King St., Brockville | 3 pkgs. | 0 38 | Canada Paint Co., Montreal |
| „ 22 | 23178 | R. W. Ross & Co., Prescott, Ont. | 1 lb ... | 0 20 | Lewis Berger & Sons, England |
| „ 22 | 23179 | A. A. Harding, Prescott, Ont | 1 „ ... | 0 25 | Lyman, Sons & Co |
| „ 21 | 23167 | A. Strachan, Princess St., Kingston | 1 „ ... | 0 25 | Jno. Lucas & Son. |
| „ 21 | 23168 | Walton & Strange, Princess St., Kingston | 1 „ ... | 0 25 | Canada Paint Co., Montreal |
| „ 21 | 23169 | G. W. Mahood, Princess St., Kingston. | 1 „ ... | 0 35 | |
| „ 21 | 23170 | H. B. Taylor, Kingston | 1 „ ... | 0 30 | |
| „ 21 | 23171 | H Wade, King St., Kingston | 3 pkgs. | 0 38 | Jno. Lucas & Son |
| „ 21 | 23172 | E. Ebells, King St., Kingston | 1 lb . . | 0 25 | Canada Paint Co., Montreal |
| „ 30 | 23180 | C. A. McHaffer, Cornwall, Ont. | 1 „ ... | 0 35 | Sherwin-Williams Paint Co. |
| „ 30 | 23181 | E. H. Brown, Cornwall, Ont | 1 „ ... | 0 25 | Lyman, Sons & Co., Montreal |
| „ 30 | 23182 | H. Pitts, Cornwall, Ont. | 1 „ ... | 0 25 | Canada Paint Co., Montreal |
| | | *District of Toronto.* | | | |
| April 16 | 23451 | Wm. Crossland, Barrie, Ont | 1 lb ... | 0 25 | |
| „ 16 | 23452 | H. G. Robertson, Barrie, Ont | 1 „ ... | 0 25 | Nobbs Hardware Co. |
| „ 17 | 23453 | Thomas Ramsay, Hamilton | 1 „ ... | 0 20 | |
| „ 17 | 23454 | Parke & Parke, Hamilton | 1 „ ... | 0 20 | |
| „ 17 | 23455 | H. E. Hawkins, King St., Hamilton | 1 „ ... | 0 20 | Dominion Drug Co. |
| „ 17 | 23456 | John Mack, James St., Hamilton | 1 „ ... | | |
| „ 17 | 23457 | J. A. Zimmerman, King St., Hamilton. | 1 „ ... | 0 25 | |
| „ 17 | 23458 | Wood, Valance & Co., Hamilton. | 3 pkgs. | 0 30 | |
| „ 17 | 23459 | „ „ „ | 3 „ . | 0 30 | John Lucas & Co. |
| „ 17 | 23460 | G. W. Spackman, Market Sq., Hamilton | 3 „ . | 0 25 | L. Berger & Sons, England |
| „ 18 | 23461 | A. Stewart, Guelph, Ont | 1 lb ... | 0 20 | |
| „ 18 | 23462 | W. Herod, Guelph, Ont | 1 „ ... | 0 20 | |
| „ 18 | 23463 | A. B. Petrie, St. Catharines | 1 „ ... | 0 20 | |
| „ 18 | 23106 | P. Dwyer, Guelph, Ont. | 1 „ ... | 0 25 | |
| „ 18 | 23107 | McEdward & Moon, Guelph, Ont | 1 „ .. | 0 25 | |
| „ 18 | 23108 | H. Southcott, Guelph, Ont | 1 „ ... | 0 25 | John Lucas & Son. |
| | | *District of London.* | | | |
| April 16 | 22067 | Peter Hymman, Berlin, Ont | 1 lb ... | 0 25 | Canada Paint Co., Montreal |
| „ 17 | 22071 | Gies Wolfhard & Co., Berlin | 1 „ ... | 0 25 | Vendors |
| „ 17 | 22072 | Theron Buchanan, Galt, Ont | 1 „ ... | 0 30 | Steele & Wood, Toronto |

Paris Green as sold in 1902–3.—*Continued.*

| Results of Analysis. | | | | | Name of Analyst and Remarks. | No. of Sample. |
|---|---|---|---|---|---|---|
| Cupric Oxide. | Arsenious Acid. | Acetic Anhydride. | Moisture. | Solubility in Ammonia. | | |
| p. c. | p. c. | p. c. | p. c. | | | |
| 31·85 | 55·29 | Not determined. | 0·58 | 0·25 p.c. insoluble in ammonia. | Dr. J. T. Donald ; genuine | 21262 |
| 31·30 | 53·51 | " .. | 0·95 | Practically complete. | " " | 21263 |
| 30·51 | 53·97 | " .. | 1·06 | " .. | " " | 21264 |
| 30·78 | 52·99 | " .. | 1·20 | " .. | " " | 21265 |
| 30·69 | 54·11 | " .. | 0·88 | " .. | " " | 21266 |
| 29·35 | 53·20 | " .. | 1·02 | Practically complete. | " " | 21267 |
| 30·95 | 53·93 | " .. | 1·15 | " .. | " " | 21268 |
| 32·07 | 53·68 | " .. | 1·47 | " .. | " " | 21269 |
| 31·04 | 53·99 | " .. | 0·83 | " .. | " " | 21270 |
| 30·30 | 53·52 | Undetermined. | Undetermined. | Complete. | Alph. Lemoine ; unadulterated. | 23173 |
| 31.30 | 54·63 | " .. | " . | " | " " | 23174 |
| 31·40 | 55·20 | " .. | " .. | " | " " | 23175 |
| 31·50 | 56·74 | " .. | " .. | " | " " | 23176 |
| 30·50 | 54·14 | " .. | " .. | " | " " | 23177 |
| 31·60 | 55·81 | " .. | " .. | " | " " | 23178 |
| 30·70 | 53·77 | " .. | " .. | " | " " | 23179 |
| 30·10 | 54·39 | " .. | " .. | " | " " | 23167 |
| 30·20 | 54·94 | " .. | " .. | " | " " | 23168 |
| 31·80 | 55·94 | " .. | " .. | " | " " | 23169 |
| 31·00 | 54·95 | " .. | " . | " | " " | 23170 |
| 29·20 | 54·32 | " .. | " .. | " | " " | 23171 |
| 30·00 | 55·32 | " .. | " .. | " | " " | 23172 |
| 30·60 | 55·19 | " .. | " .. | " | " " | 23180 |
| 31·10 | 54·51 | " .. | " .. | " | " " | 23181 |
| 30·40 | 55·06 | " .. | " . | " | " " | 23182 |
| 30.04 | 55·52 | 9·71 | 0·95 | Complete.... | Dr. W. H. Ellis ; unadulterated | 23451 |
| 29·18 | 51·28 | 9·71 | 0·93 | " | " " | 23452 |
| 30·26 | 51·96 | 9·94 | 0·88 | " | " " | 23453 |
| 27·28 | 54·77 | 8·36 | 0·54 | Trace insoluble.. | Dr. W. H. Ellis ; contains too little copper and too much arsenious acid : contains free arsenious acid. | 23454 |
| 30·40 | 54·01 | 9·04 | 0·65 | Complete | Dr. W. H. Ellis ; unadulterated | 23455 |
| 30·53 | 50·66 | 9·26 | 0·80 | " | " " | 23456 |
| 32·37 | 52·79 | 9·15 | 0·67 | 3·40 p.c. insoluble | " " | 23457 |
| 30·28 | 52·53 | 9·37 | 0·68 | Complete.. .. | " " | 23458 |
| 30·54 | 52·38 | 9·15 | 0·81 | " | " " | 23459 |
| 31·52 | 53·25 | 8·70 | 0·81 | Trace insoluble.. | " " | 23460 |
| 31·29 | 52·85 | 9·37 | 0·82 | " .. | " " | 23461 |
| 27·95 | 58·15 | 9·04 | 0·82 | " .. | Dr. W. H. Ellis ; composed of paris green with excess of arsenious acid. | 23462 |
| 31·58 | 53·79 | 9·92 | 0·90 | Complete. | Dr. W. H. Ellis ; unadulterated | 23463 |
| 30·46 | 52·58 | 9·15 | 0·64 | 0·23 p.c. insoluble | " " | 23106 |
| 31·49 | 52·73 | 9·83 | 0·72 | Trace insoluble.. | " " | 23107 |
| 31·28 | 52·85 | 9·49 | 0·90 | " .. | " " | 23108 |
| 31·10 | 55·01 | Undetermined. | Undetermined. | Complete.... .. | Alph. Lemoine ; genuine | 22067 |
| 31·60 | 55·32 | " .. | " . | " | " " | 22071 |
| 31·60 | 54·08 | " .. | " .. | " | " " | 22072 |

RESULTS of examining 169 Samples of

| Date of Collection. | No. of Sample. | Name and Address of Vendor. | Quantity. | Cost. | Name and Address of Manufacturer or Furnisher as given by Vendor. |
|---|---|---|---|---|---|
| 1903. | | *District of London*—Con. | | $ cts. | |
| " 21 | 22081 | James Wilson & Bros., Windsor, Ont. | 1 " | 0 25 | Canada Paint Co., Montreal. |
| " 21 | 22082 | D. L. Wigle & Son, Windsor, Ont. | 1½ lbs. | 0 38 | " " |
| " 21 | 22084 | Worbent, Clinton & Batter, Windsor. O. | 3 tins. | 0 15 | D. H. Howden, London, Ont |
| April 22 | 22086 | Westman Bros., Chatham, Ont. | 1 lb.<br>3 cups | 0 25<br>0 15 | Vendors |
| " 22 | 22089 | A. H. Patterson " | 1 lb.<br>3 cups. | 0 20<br>0 15 | Toronto Lead & Colour Co. |
| " 22 | 22092 | D. Machlan, Glencoe, Ont. | 3 pots. | 0 40 | David Howden, London. |
| " 23 | 22094 | A. Westman, London, Ont. | 1½ lbs. | 0 30 | J. Pfeiffer, New York. |
| " 24 | 22101 | T. W. Dunn, Ingersoll, Ont. | 1 lb. | 0 25 | Canada Paint Co., Montreal. |
| " 24 | 22102 | Robertson & McKay, Ingersoll, Ont. | 1½ lbs. | 0 35 | Lewis Berger & Sons, Eng. |
| " 24 | 22103 | James Cown, London, Ont. | 1 lb. | 0 25 | John Lucas & Co., Philadelphia |
| " 24 | 22104 | James Reid " | 1 " | 0 20 | Vendor. |
| a 24 | 22107 | J. C. Grefin, St. Mary's. | 1½ lbs. | 0 30 | Canada Paint Co., Montreal. |
| | | *District of Winnipeg.* | | | |
| " 21 | 17446 | J. B. Cain, Virden | 1½ " | 0 60 | Canada Paint Co., Montreal. |
| " 24 | 17454 | Brown & Mitchell, Brandon. | 1 lb. | 0 35 | |
| May 6 | 17461 | Anderson & Thomas, Winnipeg. | 1 " | 0 30 | G. F. Stevens & Co., Winnipeg. |
| " 6 | 17462 | C. A. Baskerville & Co., Winnipeg. | 1 " | 0 35 | Canada Paint Co., Montreal. |
| " 6 | 17463 | J. H. Ashdown & Co., " | 1 " | 0 30 | " " " |
| " 6 | 17470 | N. H. Jackson, Winnipeg. | 1 " | 0 40 | Dominion Drug Co., Hamilton. |
| " 6 | 17473 | W. R. Inman " | 1 " | 0 35 | Canada Paint Co., Montreal. |
| " 6 | 17474 | Payntz & Co. " | 1 " | 0 50 | Bole Dfug Co., Winnipeg. |
| " 6 | 17475 | Graham & Robston, Winnipeg. | 1 " | 0 30 | Canada Paint Co., Montreal. |
| " 6 | 17476 | W. A. Templeton " | 1 " | 0 25 | A. Ramsay & Son., Montreal. |
| | | *District of Manitoba.* | | | |
| April 26 | 21731 | Cawker & Son, Medicine Hat. | 1 " | 0 60 | |
| " 27 | 21734 | F. Nichol, Lethbridge. | 1 " | 0 65 | Martin Bole & Wynne, Winnipeg |
| " 27 | 21735 | Higinbotham, Lethbridge, Man | 1 " | 0 60 | Canada Paint Co., Montreal. |
| " 28 | 21737 | A. Young & Co., McLeod, Man. | 1 " | 0 50 | Bole Drug Co., Winnipeg |
| " 29 | 21740 | C. Wallace, Calgary. | 1 " | 0 75 | B. Ansbacher & Co., New York. |
| " 29 | 21741 | W. McLean " | 1 " | 0 40 | Evans & Co., Montreal. |
| " 29 | 21742 | Owen Both " | 1 " | 0 65 | Martin Bole & Wynne, Winnipeg |
| " 29 | 21743 | James Findley " | 1 " | 0 50 | Lyman Sons & Co., Montreal. |
| | | *District of British Columbia.* | | | |
| " 16 | 21689 | Coulter & Berry, Langley, B.C. | 1½ " | 0 55 | Henderson Bros., Vancouver. |
| " 16 | 21692 | H. Alder, Mt. Lehman, B.C. | 14 ozs. | 0 35 | |
| " 17 | 21698 | H. C. Henderson, Chilliwack, B.C. | 1½ lbs. | 0 60 | McDonnell, Aitken, Watson Co., Vancouver. |
| " 17 | 21700 | G. R. Ashwell & Sons, Chilliwack, B.C. | 1½ " | 0 55 | Henderson Bros., Vancouver. |
| " 17 | 23506 | Baiker & Henderson " | 1½ " | 0 50 | Nelson, McPherson, Sutherland Drug Co. |
| " 18 | 23513 | J. Plumridge, Mission, B.C. | 1½ " | 0 45 | |
| " 18 | 23524 | Marshall Smith, Ladner's Landing. | 3 " | 0 45 | Wood's, Ladner's Landing |
| " 18 | 23526 | F. J. McKenzie " | 1½ " | 0 75 | |
| " 18 | 23532 | Hall & Co., Victoria, B.C. | 3 " | 1 50 | J. H. Winer, Hamilton. |
| " 18 | 23533 | Dean & Hiscocks " | 1½ " | 0 75 | Henderson Bros., Vancouver. |
| " 18 | 23534 | C. H. Bow " | 2½ " | 1 00 | Canada Paint Co., Montreal. |
| " 18 | 23535 | Davies Bros. " | 1½ " | 0 75 | Henderson Bros. |
| " 27 | 23543 | C. Nelson, Vancouver, B.C. | 3 " | 1 50 | A. B. Ansbacher & Co., New York. |
| " 27 | 23544 | C. Woodman " | 2 " | 0 50 | |
| " 28 | 23547 | G. T. Burnett, New Westminster | 1½ " | 0 75 | |
| " 28 | 23550 | H. Ryall, New Westminster. | 1½ " | 0 60 | Henderson Bros., Vancouver. |

Paris Green as sold in 1902–3—*Continued.*

| Results of Analysis. | | | | | | |
|---|---|---|---|---|---|---|
| Cupric Oxide. | Arsenious Acid. | Acetic Anhydride. | Moisture. | Solubility in Ammonia. | Name of Analyst and Remarks. | No. of Sample. |
| p. c. | p. c. | p. c. | p. c. | | | |
| 30·80 | 54·82 | Undetermined. | Undetermened. | Complete | Alph. Lemoine; genuine | 22081 |
| 29·90 | 54·75 | " | " | " | " " | 22082 |
| 30·10 | 54·39 | " | " | " | " " | 22084 |
| 31·60 | 54·82 | " | " | " | " " | 22086 |
| 30·10 | 53·89 | " | " | " | " " | 22089 |
| 29·40 | 54·44 | " | " | " | " " | 22092 |
| 31·20 | 55·56 | " | " | " | " " | 22094 |
| 29·30 | 53·89 | " | " | " | " " | 22101 |
| 30·50 | 54·14 | " | " | " | " " | 22102 |
| 31·10 | 55·50 | " | " | " | " " | 22103 |
| 28·30 | 53·27 | " | " | " | " " | 22104 |
| 29·90 | 54·26 | " | " | " | " " | 22107 |
| 31·77 | 57·60 | " | 1·34 | | Prof. E. B. Kenrick, Winnipeg; genuine | 17446 |
| 28·88 | 56·99 | " | 1·55 | | " " " | 17454 |
| 31·90 | 57·77 | " | 1·15 | | " " " | 17461 |
| 31·85 | 57·58 | " | 1·39 | | " " " | 17462 |
| 32·11 | 57·61 | " | 1·12 | | " " " | 17463 |
| 28·43 | 61·62 | " | 1·39 | | " " " | 17470 |
| 32·17 | 57·74 | " | 1·13 | | " " " | 17473 |
| 31·93 | 57·63 | " | 1·14 | | " " " | 17474 |
| 31·61 | 57·73 | " | 0·75 | | " " " | 17475 |
| 31·73 | 57·50 | " | 1·11 | | " " " | 17476 |
| 32·24 | 57·65 | " | 1·14 | | " " " | 21731 |
| 31·60 | 56·94 | " | 1·25 | | " " " | 21734 |
| 32·00 | 56·90 | " | 1·16 | | " " " | 21735 |
| 31·87 | 57·53 | " | 1·16 | | " " " | 21737 |
| 30·33 | 56·56 | " | 1·34 | | " " " | 21740 |
| 30·65 | 57·47 | " | 0·90 | | " " " | 21741 |
| 30·60 | 56·96 | " | 1·17 | | " " " | 21742 |
| 31·16 | 57·02 | " | 1·25 | | " " " | 21743 |
| 29·12 | 58·40 | " | 1·4 | Traces insoluble. | Dr. C. J. Fagan, Victoria, B.C.; genuine | 21689 |
| 28·86 | 58·10 | " | 1·4 | None insoluble | " " " | 21692 |
| 28·86 | 58·10 | " | 1·1 | " | " " " | 21698 |
| 29·12 | 57·50 | " | 1·38 | " | " " " | 21700 |
| 28·86 | 58·10 | " | 1·08 | " | " " " | 23506 |
| 29·12 | 56·90 | " | 1·44 | " | " " " | 23513 |
| 28·52 | 57·70 | " | 1·26 | " | " " " | 23524 |
| 28·34 | 58·10 | " | 1·44 | " | " " " | 23526 |
| 27·56 | 57·40 | " | 1·12 | " | " " " | 23532 |
| 28·08 | 56·90 | " | 1·22 | " | " " " | 24533 |
| 27·82 | 56·60 | " | 1·30 | " | " " " | 23534 |
| 28·08 | 56·40 | " | 1·14 | " | " " " | 23535 |
| 28·52 | 56·40 | " | 1·30 | " | " " " | 24543 |
| 28·52 | 56·40 | " | 1·30 | " | " " " | 23544 |
| 28·86 | 56·40 | " | 1·46 | " | " " " | 23547 |
| 28·52 | 56·60 | " | 1·26 | " | " " " | 23550 |

# REPORT

OF THE

# MINISTER OF AGRICULTURE

FOR THE

## DOMINION OF CANADA

FOR THE

## YEAR ENDED OCTOBER 31

## 1903

*PRINTED BY ORDER OF PARLIAMENT*

OTTAWA
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1904

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# TABLE OF CONTENTS.

PAGE.

MINISTER'S REPORT:—

I. General remarks . . . . . v

II. Arts and Agriculture . . . . . x

Branch of Commissioner of Agriculture and Dairying . . . . . x
- Dairy division . . . . . xii
- Cold Storage division . . . . . xviii
- Seed division . . . . . xxiii
- Poultry division . . . . . xxvi
- Extension of Markets division . . . . . xxviii
- The Fruit division . . . . . xxx
- Live Stock division . . . . . xxxii

Experimental Farms branch . . . . . xxxvi
- Agriculture and Live Stock division . . . . . xxxviii
- Horticultural division . . . . . xxxix
- Entomological and Botanical division . . . . . xl
- Chemistry division . . . . . xliii
- Cereal Breeding and Experimentation division . . . . . xliv
- Poultry division . . . . . xlv
- Branch farms . . . . . xlvi

General crops . . . . . xlix

Live Stock Inspections . . . . . lii

Archives . . . . . lii

III. Patents of Invention . . . . . liii

IV. Copyrights, Trade Marks, Industrial Designs and Timber Marks . . lviii

V. Public Health and Quarantine . . . . . lix

VI. Statistics . . . . . lxi

# REPORT

OF THE

# MINISTER OF AGRICULTURE

# 1903

*To His Excellency the Right Honourable Sir* GILBERT JOHN ELLIOT, *Earl of Minto, and Viscount Melgund of Melgund, County of Forfar, in the Peerage of the United Kingdom, Baron Minto of Minto, County of Roxburgh, in the Peerage of Great Britain, Baronet of Nova Scotia, Governor General of Canada.*

MAY IT PLEASE YOUR EXCELLENCY—

I have the honour to submit to Your Excellency the annual report of the Department of Agriculture, for the year ended October 31, 1903.

## I.—GENERAL REMARKS.

The work of the department has been carried on efficiently, and a synopsis of the operations of the various branches comprised therein is laid before Your Excellency under their respective headings.

The legislation affecting the department during the last session consisted of Chapter 6, 3 Edward VII., intituled 'An Act to prohibit the importation, manufacture or sale of adulterated, process or renovated butter, oleomargarine, butterine or other substitute for butter, and to prevent the improper marking of butter.'

Chapter 11, 3 Edward VII., intituled 'An Act respecting infectious or contagious diseases affecting animals.'

Also Chapter 46, 3 Edward VII., 'An Act to amend the Patent Act.'

By Order in Council of August 30, 1902, in virtue of the provisions of Section 12 of Chapter 69 of the Revised Statutes of Canada, the destruction of any or all horses affected with the disease of glanders was authorized with a view to exterminating as early as possible this disease in the Dominion of Canada, vide *Canada Gazette*, vol. xxxvi., p. 441.

By Order in Council of December 15, 1902, in view of the fact that there prevails in certain parts of the New England States, forming part of the United States of America, an infectious disease affecting animals, known as 'Foot and Mouth' disease; and in virtue of the provisions of Chapter 69 of the Revised Statutes, intituled 'An Act respecting infectious or contagious diseases affecting animals,' it was ordered that the introduction or importation into Canada of cattle, sheep or other animals or swine, or their skins, hides, horns, hoofs, wool or bristles, coming from the States of Maine, Vermont, New Hampshire, Massachusetts, Connecticut and Rhode Island, forming part of the United States of America aforesaid, shall be prohibited until otherwise ordered. Provided, however, that the dried or pickled or salted green cured skins or hides, and the horns, hoofs, wool and bristles of cattle, sheep or other ruminants or swine may be imported into Canada when originating outside of the said six states and not produced from animals grown or slaughtered in any of the said six states, although shipped from the said six states under regulations to be made by the Department of Customs, approved by the Minister of Agriculture. Vide *Canada Gazette,* vol. xxxvi., p. 1145.

By Order in Council of January 15, 1903, the Order in Council of January 5, 1901, by which nursery stock was permitted to enter Vancouver, in the province of British Columbia, during the winter months only, from October 15 to March 15, was amended by extending the time from October 15 to April 15, instead of March 15. Vide *Canada Gazette,* vol. xxxvi., p. 1434.

By Order in Council of February 7, 1903, the Order in Council of December 15, 1902, respecting the prohibition of the importation or introduction into Canada of cattle, sheep, or other ruminants, or swine, from certain states forming part of the United States of America, owing to the prevalence therein of an infectious disease affecting animals, known as 'Foot and Mouth' disease, was amended by adding after the word 'ordered' in the second paragraph thereof, the following words to wit:—

'Except that animals not previously having been in any of the said quarantined states may pass from one part of Canada through the said State of Maine by the Canadian Pacific Railway, to another part of Canada; provided said animals be so carried in bonded cars sealed, that they cannot be removed from said cars while within the said State of Maine.' Vide *Canada Gazette,* vol. xxxvi., p. 1620.

It was thought advisable from the experience gained during the past few years, to amend the Animal Contagious Diseases Act, which was found unwieldly and to simplify it and render it more workable.

I therefore introduced in parliament a bill in which a considerable number of changes were embodied.

This Bill was introduced early in the session, and after full discussion and amendment in both Houses of Parliament, received the Royal Assent and became law on August 13 last.

By this Act 'The Animal Contagious Diseases Act,' Chapter 69, of the Revised Statutes of Canada, and Chapter 13, of the Statutes of 1896 (first session), in amendment thereof, are repealed.

During the recent session I introduced in parliament a Bill respecting the inspection and sale of seeds, which on second reading, was amended.

Although the general principles of the Bill are strongly supported, it was considered wise to allow it to stand until the next session of parliament, in order that those interested might have an opportunity to examine more closely into its provisions, and submit views as to any difficulties which such a law might bring about in the trade in seeds.

During the year just passed the chief event connected with the work of my department in which I personally was concerned, was the participation in the Fifth National Exhibition of Japan, held at Osaka from March 1 to July 1.

The government on my recommendation, believing this to be an exceptional event, thought it necessary that I should go to Japan during the Exhibition, as Commissioner Extraordinary.

I have for a long time felt it very important that Canada should make a determined effort to secure a share of the trade between America and the orient. This has been practically monopolized by the United States, the merchants of that country even handling such Canadian goods as have been sold in Japan. This has been the case to such an extent that the Japanese people did not realize that they were purchasing any Canadian goods, and knew practically nothing of our country. The only way in which Canada came to the notice of the people of Japan was in connection with the legislation of British Columbia for the exclusion of Japanese, and for the purpose of creating disabilities for such Japanese as were in Canada, in their industrial pursuits.

An opportunity was given Canada to participate in this international exhibition by an invitation which was extended to the government by the Consul General of Japan, Hon. Mr. Nosse. I urged upon my colleagues the advisability of accepting this invitation, and of sending a carefully prepared exhibit of such Canadian products and manufactures as were likely to attract the attention of the Japanese and to be suitable for export to that country.

Mr. William Hutchison, the exhibition commissioner, was authorized to take charge of this work, prepare the exhibit, forward it, install it at the exhibition, and do whatever was possible to make it a success. I wish to congratulate him and all who were concerned in the work on the great success that attended their efforts.

We secured the erection of a special building by the exhibition authorities for our exhibit. This was placed in a most conspicuous location, and was very satisfactorily provided for us. Our exhibits arrived in good order and were installed under the direction of Mr. Hay, of my exhibition staff. The installation, arrangement and decoration was quite unique and most successful, so much so that we were awarded the medal which was offered by the authorities in Japan for the most artistic and best arranged exhibit.

The exhibition at Osaka was in itself a remarkably successful one. I can compare it most favourably with the international exhibition which was held at Buffalo, in the United States, last year, in which we also took part.

I must congratulate the Japanese authorities on the excellent manner in which the exhibition was organized, administered, and worked out. The exhibits of Japanese products and manufactures, art and historical collections, were beautifully arranged in such a way as to enable the spectator to enjoy them, or the student to utilise them to the best advantage.

There were over four million people who visited the exhibition, and the vast majority of these entered and carefully examined our Canadian building. One fact was strikingly noticeable, that the Japanese not only went about looking cursorily at things, but there was a very large number of young men who examined and studied closely and took copious notes of everything that they saw.

One instance will illustrate the results of this. We had a complete bread-baking outfit in the exhibition, which was soon sold to an Osaka baker, to be delivered at the end of the exhibition and used by him in his trade. Long before the end of the exhibition a similar outfit was constructed and set up, and in operation by a baker in the city, modelled on ours and apparently in every respect just as successful.

The exhibition was a means of attracting very great attention to Canada, and Canadian products all over Japan, and even in the adjacent oriental countries, China, Corea, the Philippines, the Straits Settlements, &c., because visitors from all these countries were very numerous, and they made a point of inspecting the Canadian building.

The report of my commissioner, which is an appendix to this volume, goes into details of the Canadian trade which may be opened up in the Orient. I would, however, here personally impress upon the Canadian producer and manufacturer the absolute necessity of prompt action in this respect. The United States merchants and exporters now possess the market there as far as United States products are concerned. They are active and energetic, and it will require that our people should take steps to meet them and beat them on the ground.

The exhibition has paved the way for success in this effort. We are able to show the great superiority of Canadian hard wheat flour to that which the United States has been exporting to Japan. We were able to show a small collection of excellent furniture such as has never been seen before in that country. We were able to show a complete exhibit of pulp wood, pulp and paper such as had never been seen, and which attracted a great deal of attention. Our dairy products, fruits, biscuits and canned goods also were *en evidence* and proved that Canada could produce these things as well or better than any of her rivals in the Japanese markets. The Japanese are now ready to take Canadian goods, but they will not do so unless the Canadian exporter gives them the opportunity, and they will buy the United States and other goods instead of ours if the United States and other agents are on the spot and push their wares, while our agents are not to be found.

It was considered that this Oriental trade was of such importance that it would be well for me to personally visit the exhibition and see what could be done. It was appreciated also that with an Oriental people the presence of a member of the government, with the suitable introduction, would attract more attention to our exhibit and to our trade than could in any other way be secured. It was, therefore, arranged for a personal visit to Japan. The authorities seemed to be much flattered by the presence of a Minister of the British Crown in their country, and received me with a great deal of attention, and accorded me every facility for best securing what I desired.

I had the honour of being presented to the Emperor and Empress, and also of receiving them in a special visit to our Canadian building when they inspected the exhibition. In Japan such an honour is valued very highly, and was considered to be a mark of special friendship for and attention to Canada; and this Imperial visit to our exhibit secured for our country and for our exhibit an attention which nothing else could possibly have brought about. Their Imperial Majesties expressed themselves as greatly pleased with our exhibit.

I caused to be sent to them specimens of Canadian fruits, preserves and bread, which were used in the palace, and which were pronounced there to be most excellent. This of itself aided very much in the general appreciation of our goods. A piano also and several articles of furniture which were on exhibition were purchased for the Imperial and governmental households.

Nearly every one of our Canadian exhibits was left in the country, and will serve as an advertisement for Canadian goods and products. Since the exhibition opened I am extremely gratified to say that numerous and extensive orders have come from Japan for some of our products, and the trade with that country is being steadily and extensively increased. This justifies our participation in the exhibition, and I am sure that an abundant and full return will come to the country for the money expended.

Our participation in the St. Louis exhibition, which opens next May, has necessitated continued preparations, which I am glad to say are now in a very forward state, and I trust that when the time comes Canada will be thoroughly well represented there. The contract for our building at St. Louis has been let, and the building almost completed.

The question of our participation in the live stock exhibit is still under consideration. A number of the live stock men of Canada earnestly desire to send Canadian stock to the exhibition, but difficulties present themselves in regard to the conditions under which this stock must be exhibited. I trust, however, that these difficulties will be overcome, and that Canada will be able to make a satisfactory and successful exhibit.

I have, as usual, visited the great agricultural gatherings of the country, the Guelph Fat Stock Show, the Dairy Convention meetings, and others of a more local character. I am glad to congratulate the farmers of Canada on the continued and increasing interest which is taken in these great gatherings. The discussions and illustrations which are thus brought about are of the utmost value to the progress of agriculture in the country; and the organization which my department has now made, enabling the best authorities and experts upon various agricultural subjects to be brought to these gatherings and there express their views, is one of the most important educational features in our Canadian agriculture. I hope to be able to still more increase this work and the benefit that accrues from it.

In this connection I must, however, express regret that the head of my agricultural and dairying branch has been absent from this work. Professor Robertson's health broke down early last summer, and he has been obliged to take a lengthened leave of absence. I am glad to know that with rest his health is improving, and I trust that before long he will once more be able to take up the very valuable work that he has done for Canadian agriculture.

During the absence of the Commissioner of Agriculture and Dairying, the work of his branch has been most efficiently carried on by Mr. J. A. Ruddick, acting commissioner, and the other officers of the branch.

I am pleased to say that the improvements at the Grosse Isle quarantine station have been brought to a completion, and that now that station may be said to be thoroughly well equipped for the purpose for which it is intended. The prospects are that a much larger number of immigrants will come to St. John, N.B., during the coming winter. Apparently it will be necessary to immediately increase the accommodation there.

Constant improvements are being made at the quarantine stations at Halifax, St. John, and Victoria, B.C., which are materially adding to the efficiency of these stations.

The work of the health of animals branch is found to be largely increasing. With the constant presence of the chief of this branch at headquarters in Ottawa, the people of the country at large who are interested in veterinary work have found more complete and more prompt attention to their various demands and necessities, and with these the obligations of the department are constantly increasing. It has, therefore, been found necessary to somewhat increase the permanent staff of professional men, and also the office staff, but the good which I am sure will result to the live stock interests of the country will well compensate for this addition.

## II.—ARTS AND AGRICULTURE.

### BRANCH OF THE COMMISSIONER OF AGRICULTURE AND DAIRYING.

The branch of the Commissioner of Agriculture and Dairying has been subdivided into divisions, in order that the constantly increasing volume of work assigned to it, may be more systematically and effectively dealt with. The divisions already organized are the 'live stock division,' the 'dairy division,' the 'cold storage division,' the 'fruit division,' the 'poultry division,' the 'seed division,' and the 'extension of markets division.' The work of these divisions is under the general direction of the Commissioner of Agriculture and Dairying, with a chief officer, who takes up the details, in immediate charge of each one, except the cold storage division, which is under the joint supervision of the Commissioner of Agriculture and Dairying and the chief of the dairy division.

The chiefs of divisions are men of technical training and experience along the line of the work entrusted to them. The general object of the work in the branch of the Commissioner of Agriculture and Dairying is to render assistance towards the improvement of all agricultural products, including the means and methods of their production, transportation and marketing, with particular regard to those which may be grouped under the name of food products.

The export commerce of the country in most of the farm products is increasing at a very rapid rate. The following statement of the value of the exports of some of the farm products of Canada during the years 1896 to 1903, shows the growth in that period and indicates somewhat of the great possibility for further expansion of this trade:—

VALUE OF SOME CANADIAN FARM PRODUCTS EXPORTED FROM 1896 TO 1903.

(Years ending June 30.)

| | 1896. | 1897. | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. |
|---|---|---|---|---|---|---|---|---|
| | $ | $ | $ | $ | $ | $ | $ | $ |
| Wheat........ | 5,771,521 | 5,544.197 | 17,313,916 | 7,784,487 | 11,995.488 | 6,871,939 | 18,688,092 | 24,566,703 |
| Flour........ | 718,433 | 1,540,851 | 5,425.760 | 3,105,288 | 2,791,885 | 4,015,226 | 3,968,850 | 4,699,143 |
| Oats......... | 273,861 | 1,655,130 | 3,041,578 | 3,268,388 | 2,143,179 | 2,490,521 | 2,052,559 | 2,583,151 |
| Oatmeal....... | 364,655 | 462,949 | 554,757 | 396,568 | 474,991 | 467,807 | 344,352 | 537,002 |
| Pease......... | 1,299,491 | 2,352,891 | 1,813,792 | 1,955,598 | 2,145,471 | 2,674,712 | 1,805,718 | 1,052,743 |
| Cattle......... | 7,082,542 | 7,159,388 | 8,723,292 | 8,522 835 | 9,080,776 | 9,064,562 | 10,663,819 | 11,342,632 |
| Sheep and lambs. | 2,151,283 | 1,002,011 | 1,272,077 | 1,540,857 | 1,894,012 | 1,625,702 | 1,483,526 | 1,655,681 |
| Cheese ....... | 13,956,571 | 14,676,239 | 17,572,763 | 16,776,765 | 19,856,324 | 20,696,951 | 19,686,291 | 24,712,943 |
| Butter....... | 1,052,089 | 2,089,173 | 2,046,688 | 3,700,873 | 5,122,156 | 3,295,663 | 5,660,541 | 6,954,618 |
| Pork, bacon and hams........ | 4,446,884 | 5,871,988 | 8,092,930 | 10,473,211 | 12,803,034 | 11,829,820 | 12,457,863 | 16,029,269 |
| *Poultry....... | 18,992 | 56,792 | 97,473 | 139,759 | 210,822 | 141,518 | 238,047 | 160,518 |
| Eggs......... | 807,086 | 978,479 | 1,255,304 | 1,267,063 | 1,457,902 | 1,691,640 | 1,733,242 | 1,436,130 |
| †Fruits........ | 1,716,278 | 2,987,839 | 1,709,360 | 3,596,415 | 3,305,662 | 2,006,235 | 1,922,304 | 3,689,662 |
| Totals.... | 39,659,686 | 46,377,927 | 68,919,688 | 62,528,107 | 73,281,702 | 66,872,296 | 80,705,184 | 99,420,195 |

* Dressed and undressed.

† Including green, dried, canned and preserved.

There has been a much larger increase in the production of these products than is indicated in the preceding table. The increase in population and the greater prosperity of the people generally, has added to the home consumption enormously.

This increase in production is not so much due to an extension of the areas devoted to agriculture as it is to the improved methods of farming now employed, and the progress which farmers are making in ability to manage the forces of nature, for their advantage and profit.

The erection of large and commodious farm buildings and residences is evidence of the prosperity of those who live upon the land, and a desire on their part to ameliorate the conditions surrounding them in their daily life.

The scarcity of farm labour has become rather pronounced in Ontario and parts of Quebec, and immigrants of the right sort in this class find ready employment at good wages.

A marked feature of the agricultural returns for the past year is the large increase in the export of cheese to the United Kingdom. The unusually cool weather which prevailed, enabled the cheese factories to turn out a superior article, and the improved transportation facilities, including iced cars and cooled air service on the steamships, made it possible for shippers to place it on the market with less deterioration than formerly. As a result, consumption was encouraged to such an extent as to create demand enough to force prices up to a very high level. The incentive of a high price, along with a favourable season for the production of milk, in most districts, resulted in much the largest export of cheese on record. There is in this an indication of the possibilities of the cheesemaking industry in Canada, if we only furnish the right quality.

There has been a good deal of complaint about the 'heated' flavour of our cheese, which is caused by exposure to a high temperature in the curing-rooms and during transit on land and sea. The department endeavours, by illustration and experiment, to impress upon the owners of cheese factories the importance of improving the ordinary cheese factory curing-room, so as to secure the advantages of having cheese cool-cured at all times.

I am informed that since I authorized the establishment of the central cool curing-rooms in the spring of 1902, there has been great activity along this line, and that more real improvement has been made during these two seasons than was made during the previous ten years.

## DAIRY DIVISION.

### COOL CHEESE CURING-ROOMS.

The cool cheese curing-rooms at Woodstock and Brockville, in Ontario, and Cowansville and St. Hyacinthe, in Quebec, were again operated by my department. During the period from May 18 to September 30, 47,205 cheese were received from 54 factories.

The curing-rooms were taxed to their full capacity, and the cheese from several factories had to be refused for lack of room.

I am informed that the curing-rooms at a large number of cheese factories have been improved already as a direct result of the illustration afforded by the operation of these central curing-rooms. The advantages are so pronounced that it must be only a question of time until provision is made for the cool curing of all cheese.

For the purpose of determining the saving of shrinkage and the comparative quality of cheese cured under the two conditions, 1,120 pairs of cheese from the different factories were set aside during the season, one being cured in the cool room and the other in an ordinary room where the temperature was uncontrolled. In every case the cool cured cheese was superior in quality; and the average saving of shrinkage from May 18 to September 30, was 1.23 per cent.

Owing to the importance of this question, an extended series of meetings will be held in the cheese making districts during the coming winter, at which addresses and demonstrations will be given by the superintendents of the cool curing-rooms, in order that those interested may be in possession of the information as soon as possible.

The curing-rooms are visited by a large number of dairymen and cheese makers, to whom they furnish a useful object lesson, not only in the results obtained, but also in regard to the construction and operation of cheese curing-rooms generally.

## OFFICIAL REFEREE FOR BUTTER AND CHEESE.

The official referee for butter and cheese, at Montreal, was called to examine 1,119 lots of cheese and 150 lots of butter, over which there was a dispute as to quality. Cheese and butter are purchased from the factories at a price fixed on the basis of what is known in the trade as 'finest' quality, certain standards being recognized as necessary to that grade. If the buyer finds upon examination that the quality is not up to this standard, the usual practice is to ask for a rebate on the price originally agreed upon. The referee can then be called in, by either the buyer or seller, to give an impartial and disinterested report on the quality. Out of the total number of lots examined during the season, all of which had previously been declared by the buyer to be 'under finest,' the referee pronounced 39 lots of cheese and 4 lots of butter to be up to the standard of 'finest' quality, and his decision was final in all cases.

The official referee performs other duties as supervisor of the work of the inspectors who report on the condition of food products as loaded on the steamships, the placing of thermographs in cold storage and cool air compartments, &c.

## THE NORTH-WEST TERRITORIES CREAMERIES.

The Department of Agriculture continues to manage a number of creameries in the North-west Territories. During the season of 1903, there were eighteen in operation, located at the following places: Edmonton, Wetaskiwin, Lacombe, Blackfalds, Red Deer, Innisfail, Tindastoll, Olds, Calgary, Moosejaw, Regina, Prince Albert, Qu'-Appelle, Grenfel, Whitewood, Moosomin, Churchbridge and Saltcoats,—being nine in northern Alberta, eight in Assiniboia, and one in Saskatchewan.

Owing partly to the favourable conditions for wheat-growing and partly to the high price paid by local merchants for dairy butter, the creameries in Assinaboia have shown a somewhat decreased output over the previous year, while those in Alberta have made 64 per cent more butter than they did in 1902.

Three more of these creameries have, as a result of the season's operations, repaid all indebtedness to the department, making thirteen in all now in this position.

During 1902 it was found necessary to ship five carloads of the butter manufactured in these creameries to England. In 1903, although the total output was increased by 130,590 pounds, the whole of it was disposed of in the western, northern and Oriental markets, at an average of about 20 cents a pound. A much larger quantity was sold for the Yukon trade, and several new and important accounts were opened in Japan, as a direct result of the Canadian exhibit at the Osaka exhibition, and the good work done there by the exhibition staff. Regular shipments are now made to the Orient by every steamer, and we seem to be in a fair way to capture the bulk of this trade. The butter for the Oriental trade is largely put up in tins.

Four of the Alberta creameries will be operated all winter.

The experiment has been tried, and proved successful, of collecting eggs from the patrons of the creameries. The eggs were placed in the creamery cold storages and shipped regularly to Calgary with the butter, where they were disposd of at prices which net the patrons 15 to 19 cents a dozen, according to locality, after deducting all expenses.

There is likely to be considerable growth of the creamery industry in northern Alberta.

## NOVA SCOTIA CREAMERIES.

The department still operates the dairy station at Nappan, and a creamery at Scotsburn and one at Mabou.

The Scotsburn creamery is making good progress, and promises to be very successful.

Most of the butter manufactured in these creameries is sold in the local markets, but a portion of it is put up for export to the British West Indies.

## GENERAL DAIRYING SERVICE.

The Assistant Dairy Commissioner, who resides at St. Denis (en bas), devotes his time largely to the French-speaking districts of the province of Quebec. He has attended numerous meetings and delivered a great many lectures in the interests of dairying and general agriculture. He conducts a large correspondence, giving advice on various subjects, and assists in carrying on the syndicate system of cheese factory and creamery instruction which has been so successful in that province.

A member of the dairy division staff visited British Columbia during the summer, and conducted a series of short courses in butter-making at different places. He also acted as judge of dairy products at several of the larger exhibitions.

An instructor was sent to Prince Edward Island in February, where he took charge of a cheese and butter-making school. covering a course of four weeks. He also spent a month on the Island during the manufacturing season, giving instructions to cheese and butter makers, and addressing meetings of patrons.

The chief of the dairy division has prepared a complete set of plans and specifications for cheese factory and creamery buildings, of different sizes, embodying all the latest ideas and improvements, and with special reference to control of temperature and sanitation. These are now being prepared for publication and distribution in pamphlet form.

An extensive series of experiments in butter-making, mainly with a view of determining the factors which control the percentage of water in butter, have been conducted under the joint auspices of the dairy division and the division of chemistry of the Experimental Farms branch. Very complete analyses have been made in conjunction with the practical work, and the results, when tabulated, will form an important contribution to original investigation along this line.

A heavy correspondence, largely of a technical nature, is conducted by the dairy division, 5,057 letters having been despatched during the year.

### REGISTERED CHEESE FACTORIES AND CREAMERIES.

There are now 1,301 cheese factories and creameries registered under the Act passed in 1897 'provide for the registration of cheese factories and creameries,' &c. &c.

The following table gives the total number of cheese factories, creameries and combined factories in Canada in 1890 and 1900, as shown by the census returns :—

| | IN 1890. | | | IN 1900. | | |
|---|---|---|---|---|---|---|
| Province. | Cheese Factories. | Creameries. | Combined C. & B. Factories. | Cheese. Factories. | Creameries. | Combined C. & B. Factories. |
| Ontario | 893 | 45 | .... | 1,061 | 103 | 168 |
| Quebec | 617 | 111 | .... | 1,207 | 445 | 340 |
| P. E. Island | 4 | .... | .... | 15 | 5 | 27 |
| Nova Scotia | 14 | 2 | .... | 15 | 8 | 10 |
| New Brunswick | 9 | 1 | .... | 49 | 13 | 6 |
| Manitoba | 23 | 8 | .... | 49 | 26 | 3 |
| N. W. Territories | 4 | 3 | .... | 2 | 21 | .... |
| British Columbia | 1 | .... | .... | .... | 8 | .... |
| Totals | 1,565 | 170 | .... | 2,398 | 629 | 554 |

## BUTTER ACT, 1903.

During the last session of parliament I introduced a bill entitled 'An Act to prohibit the importation, manufacture or sale of adulterated, process or renovated butter, oleomargarine, butterine or other substitute for butter, and to prevent the improper marking of butter.' The bill passed all its stages and became law on August 13, 1903.

It defines the following words and expressions—'Creamery,' 'dairy,' 'butter,' 'creamery butter,' 'dairy butter,' and 'renovated' or 'process butter.'

It fixes a legal limit of water in butter.

It prohibits the manufacture, importation or sale of 'oleomargarine,' 'butterine,' 'adulterated butter' or 'process butter.'

It prohibits the improper marking of butter.

The expansion of our dairy industry in the future depends very largely on the export of creamery butter, and as the extent to which this trade may be developed depends in turn on a high standard of quality being established, we are justified in adopting every possible means necessary to protect the good name of Canadian creamery butter.

The relative selling price of all butter made in Canada is influenced and regulated by the price obtained for that which is exported, and therefore it is obvious that anything which tends to improve that price will help the whole butter trade.

That there is still room for a great increase in our exports of fancy creamery butter to the markets of the United Kingdom is shown by the fact that during the year ended June 30, 1903, we sent only about 6 per cent of the total importation.

The following countries compete with us for this trade, viz. :—

Denmark, Russia, France, Holland, Sweden, New Zealand, Australia, United States, Belgium, Argentina, Norway and Germany. The four first named each supply more at present than Canada does.

In some of these countries very stringent laws have been enacted to regulate the marking, grading and export of butter, but they do not depend wholly on legislation to enable them to capture the trade. They are applying the knowledge gained through investigation and the advancement of dairy science to the production and handling of milk and the manufacture of butter. Canadians must do likewise if they wish to compete successfully in this important trade.

## EXPORTS OF BUTTER AND CHEESE.

The magnitude and growth of the export trade of Canada in dairy products is shown by the following tables (years ended June 30) :—

## Dominion of Canada—Exports of Dairy Products—Home Production.

### BUTTER.

| Year. | Quantity. | Value | To Great Britain. | To United States. | To France. | To Germany. | Other Foreign Countries. | B. N. A. Provinces. | British Indies. |
|---|---|---|---|---|---|---|---|---|---|
| | Lbs. | $ | $ | $ | $ | $ | $ | $ | $ |
| 1869 .. | 10,649,733 | 1,698,042 | 534,707 | 1,015,702 | ...... | 1,496 | 14,870 | 95,777 | 26,986 |
| 1880 .. | 18,535,362 | 3,058,069 | 2,756,064 | 111,158 | . . | ........ | 24,710 | 163,290 | 2,647 |
| 1899...... | 1,951,585 | 340,131 | 184,105 | 5,059 | ........ | ... .. | 29,342 | 119,989 | 1,636 |
| 1891.... | 3,768,101 | 602,175 | 440,060 | 10,054 | ...... | 20,447 | 24,021 | 101,649 | 5,944 |
| 1892 . | 5,736,696 | 1,056,058 | 877,455 | 6,038 | ........ | 5,160 | 27,207 | 133,770 | 6,428 |
| 1893 ... | 7,036,013 | 1,296,814 | 1,118,614 | 7,539 | ... . | 1,175 | 35,042 | 127,412 | 7,032 |
| 1894..... | 5,534,621 | 1,095,588 | 936,422 | 6,048 | 1,125 | .... ... | 25,560 | 109,263 | 14,170 |
| 1895... | 3,650,258 | 697,476 | 536,797 | 5,365 | .... | 267 | 35,028 | 108,439 | 11,580 |
| 1896 . | 5,889,241, | 1,052,089 | 893,053 | 2,729 | . | 9,370 | 34,299 | 105,472 | 7,166 |
| 1897 .. | 11,453,351 | 2,089,173 | 1,912,389 | 6,233 | .. .. | 8,513 | 33,490 | 115,754 | 12,794 |
| 1898 | 11,253,787 | 2,046,686 | 1,915,550 | 3,738 | ... | 17,574 | 31,619 | 51,045 | 27,160 |
| 1899 . . | 20,139,195 | 3,700,873 | 3,526,007 | 3,984 | . | 12,384 | 41,810 | 74,813 | 41,875 |
| 1960 ... | 25,259,737 | 5,122,156 | 4,947,000 | 5,044 | ... | 7,210 | 43,176 | 66,069 | 53,657 |
| 1901.. | 16,335,528 | 3,295,663 | 3,142,353 | 5,839 | .. . | .. .. | 39,675 | 44,986 | 62,810 |
| 1902..... | 27,855,978 | 5,660,541 | 5,459,300 | 41,149 | | 101 | 36,109 | 47,066 | 71,816 |
| 1903.... | 34,128,944 | 6,954,618 | 6,554,014 | 10,225 | | 13 | 198,381 | 69,017 | 112,968 |

### CHEESE.

| Year. | Quantity. | Value | To Great Britain. | To United States. | To France. | To Germany. | Other Foreign Countries. | B. N. A. Provinces. | British Indies. |
|---|---|---|---|---|---|---|---|---|---|
| 1868 | 6,141,570 | 620,543 | 548,574 | 68,784 | . | | 891 | 1,594 | 340 |
| 1880 | 40,368,678 | 3,893,366 | 3,772,769 | 114,507 | | | 170 | 5,710 | 210 |
| 1890.... | 94,260,187 | 9,372,212 | 9,349,731 | 6,425 | . | 370 | 2,154 | 12,777 | 755 |
| 1891 .. | 106,202,140 | 9,508,800 | 9,481,373 | 13,485 | . | . | 1,954 | 9,104 | 3,884 |
| 1892 | 118,270,052 | 11,652,412 | 11,593,690 | 39,558 | 2 | | 2,124 | 12,942 | 4,091 |
| 1893 | 133,946,365 | 13,407,470 | 13,360,237 | 23,578 | . | | 2,689 | 18,679 | 2,297 |
| 1894 . | 154,977,480 | 15,488,191 | 15,439,198 | 9,552 | ... | 173 | 3,036 | 21,948 | 14,284 |
| 1895 | 146,004,650 | 14,253,002 | 14,220,505 | 5,058 | . | 16 | 5,463 | 9,785 | 12,175 |
| 1896 .. | 164,689,123 | 13,956,571 | 13,924,672 | 10,359 | 299 | | 4,861 | 7,509 | 8,871 |
| 1897 | 164,220,699 | 14,676,239 | 14,645,859 | 4,486 | 94 | 24 | 5,365 | 11,954 | 8,457 |
| 1898 | 196,703,323 | 17,572,763 | 17,522,681 | 14,604 | . | 1,428 | 6,889 | 12,784 | 14,377 |
| 1899 | 189,827,839 | 16,776,765 | 16,718,418 | 17,739 | .... | .... | 11,701 | 13,293 | 15,614 |
| 1900 | 185,984,430 | 19,856,324 | 19,812,670 | 4,836 | . | . | 8,774 | 16,651 | 13,393 |
| 1901 | 195,926,397 | 20,696,951 | 20,609,361 | 37,691 | 465 | 12 | 15,375 | 16,603 | 17,534 |
| 1902.. | 200,946,491 | 19,686,281 | 19,620,239 | 12,658 | .... .. | 1,179 | 14,133 | 20,100 | 18,602 |
| 1903 | 229,099,925 | 24,712,943 | 24,620,004 | 7,779 | .... | 170 | 18,942 | 21,334 | 44,714 |

IMPORTS OF GREAT BRITAIN.

The following table from the Board of Trade returns of Great Britain for 12 years (ended December 31), shows the total quantities and value of butter and cheese imported into Great Britain:—

| BUTTER. | | | CHEESE. | | |
|---|---|---|---|---|---|
| Year. | Quantity. | Value. | Year. | Quantity. | Value. |
| | *Cwt. | £ stg. | | *Cwt. | £ stg. |
| 1890 | 2,027,718 | 10,598,848 | 1890 | 2,144,074 | 4,975,134 |
| 1891 | 2,135,607 | 11,591,181 | 1891 | 2,041,317 | 4,815,369 |
| 1892 | 2,183,009 | 11,965,190 | 1892 | 2,232,817 | 5,416,784 |
| 1893 | 2,327,474 | 12,753,593 | 1893 | 2,007,462 | 5,160,918 |
| 1894 | 2,574,835 | 13,456,699 | 1894 | 2,226,145 | 5,474,940 |
| 1895 | 2,825,662 | 14,245,230 | 1895 | 2,133,819 | 4,675,130 |
| 1896 | 3,037,718 | 15,344,364 | 1896 | 2,244,525 | 4,900,342 |
| 1897 | 3,217,802 | 15,916,917 | 1897 | 2,603,178 | 5,885,521 |
| 1898 | 3,209,153 | 15,961,783 | 1898 | 2,339,452 | 4,970,805 |
| 1899 | 3,389,851 | 17,213,516 | 1899 | 2,384,069 | 5,503,004 |
| 1900 | 3,378,516 | 17,450.435 | 1900 | 2,705,878 | 6,837,883 |
| 1901 | 3,702.890 | 19,297,396 | 1901 | 2,586,837 | 6,227,135 |
| 1902 | 3,974.933 | 20,526,690 | 1902 | 2,546,612 | 6,412,002 |

* Cwt. : 112 lbs.

## COLD STORAGE DIVISION.

The development and use of cold storage during recent years has revolutionized the methods of supplying the markets of the world with perishable food products. Staple foods like butter and cheese or eggs, of which there is a constant and regular consumption, but which are produced at certain seasons of the year in excess of the demand, must necessarily be accumulated to meet the needs of the period of non-manufacture or light production. Cold storage is a means of preserving such foods with a minimum of deterioration, and thus consumption is increased.

Tender varieties of fruits and certain kinds of vegetables which formerly were available only during a very limited period, may now be procured throughout the greater part of the year. The period during which the products of given localities are available has been extended, and the improved transportation facilities have brought remote parts of the world into closer touch, so that full advantage may be taken of the variations in seasons, and the more favoured localities are able to supply those districts where some food products cannot be successfully grown.

The whole question of cold storage and refrigeration is a comparatively new one, and although there has been great advancement made during the past ten years, or even during the past five years, there is yet much to learn. As improvement is made and definite standards are established, the benefits derived will be correspondingly greater.

## COLD STORAGE AND COOLED AIR ON STEAMSHIPS.

The Department of Agriculture, realizing that expansion in the profitable production of food products depends on the exportation of these products in the very best possible condition, has, by granting subsidies to the railway and steamship companies, secured services which permit of perishable products being safely handled and landed on the British markets in good condition. Without the refrigerator car service and the cold storage on steamships, a successful export trade in butter or tender fruits would be quite impracticable.

In the season of 1903, there were 172 sailings of 37 steamers from the port of Montreal, having cold storage accommodation, and 61 sailings of steamers fitted with cooled air chambers. The particulars are as follows:—

### NUMBER OF STEAMERS, SAILINGS AND CAPACITY.

### COLD STORAGE.

| Destination. | No. of steamers. | No. of sailings. | Cu. ft. capacity. |
|---|---|---|---|
| Liverpool | 10 | 59 | 228,890 |
| London | 6 | 27 | 100,734 |
| Bristol | 8 | 32 | 243,354 |
| Glasgow | 10 | 43 | 107,980 |
| Manchester | 3 | 11 | 26,000 |
| Totals | 42 | 179 | 853,858 |

### COOLED AIR.

| Destination. | No. of steamers. | No. of sailings. | Cu. ft. capacity. |
|---|---|---|---|
| Liverpool | 4 | 20 | 135,600 |
| London | 5 | 24 | 238,000 |
| Bristol | 2 | 6 | 53,000 |
| Glasgow | 3 | 11 | 65,000 |
|  | 14 | 61 | 491,600 |

There were also seven sailings to South Africa of steamers with cold storage.

The contracts entered into with agents of steamship companies, which provided for a cooled air service on twelve steamers, all expired at the close of navigation in the St. Lawrence, for the season of 1903.

Two other steamers were fitted with cooled air plants without any subsidy from the department.

The following statement gives the number of packages of butter and apples carried in cold storage to various ports:—

| Destination. | Butter, Packages. | Apples. | |
|---|---|---|---|
| | | Barrels. | Boxes. |
| Liverpool | 80,714 | 6,370 | 375 |
| London | 83,064 | 8,204 | 1,849 |
| Bristol | 130,252 | ...... | 975 |
| Glasgow | 22,273 | 7,260 | 23,537 |
| Manchester | 19,092 | .... | 366 |
| | 335,395 | 21,834 | 27,102 |

There were 6,734 cases of pears carried in cold storage and 916 cases as ordinary cargo.

In addition to the preceding there were 10,674 cases of American pears and small fruits carried in cold storage.

Only 454 packages of butter were carried as ordinary cargo during 1903, as against 1,593 packages during the previous season.

There were 43,800 boxes of cheese and 5,355 cases of Canadian bacon and 10,542 cases of American bacon carried in cooled air chambers during the season of navigation from the port of Montreal.

The following statement gives the number of packages of butter carried in cold storage, from the port of Montreal, since 1898:—

| | |
|---|---|
| 1898 | 209,172 |
| 1899 | 429,734 |
| 1900 | 227,863 |
| 1901 | 410,893 |
| 1902 | 525,735 |
| 1903 | 335,395 |

There was ample space for all the cargo offered, either for cold storage or cooled air. It may be noted that there was a falling off in the shipments of butter for the season of 1903. This was due to the relatively high price for cheese, which induced the combined factories to make cheese instead of butter.

During the season there were 199 thermographs placed in different parts of steamships sailing to Great Britain. They were placed as follows:—

| Destination. | Cold Storage Chamber with Butter and Fruit. | Cooled Air Chamber with Cheese and Fruit. | Ordinary Storage with Cheese and Fruit. |
|---|---|---|---|
| Liverpool | 45 | 6 | 9 |
| London | 30 | 20 | 2 |
| Glasgow | 33 | 3 | 1 |
| Bristol | 36 | 3 | |
| Manchester | 11 | | |
| Totals | 155 | 32 | 12 |

The following table shows the highest average temperature of any voyage and the lowest average of any voyage, recorded in cold storage chambers for butter, season 1903:—

| Lines. | Ports. | Highest Average of any Voyage. | Lowest Average of any Voyage. |
|---|---|---|---|
| | | Fahr. | Fahr. |
| Canadian Pacific | Montreal to Bristol | 38 | 24 |
| Dominion | " " | 30 | 9 |
| Donaldson | " Glasgow | 39 | 25 |
| Allan | " " | 35 | 17 |
| Dominion | " Liverpool | 36 | 10 |
| Allan | " " | 40 | 15 |
| Thomson | " London | 43 | 19 |
| Allan | " " | 35 | 24 |
| Manchester liners | " Manchester | 33 | 22 |

### REFRIGERATOR CARS FOR BUTTER.

The refrigerator car service for the carriage of butter was again operated by the railway companies under arrangement with the Department of Agriculture. Cars were started at 49 different points, and were available for shipments of butter at all stations on the routes to Montreal. The cars were run, weekly or fortnightly, according to the requirements of the route, on an advertised schedule, so that shippers might know when to deliver the butter at the stations with the least possible exposure to heat.

Shippers were charged the current 'less than carload' rates, without extra charge for icing.

This service was in operation from May 18 to October 15. The department guaranteed two-thirds of the earnings of a minimum car (20,000 lbs.), plus $4 a car for icing. When the earnings exceeded the guarantee, there was no charge against the department. If the traffic on any route exceeded one carload, the whole service on that route was held to be self-sustaining, and no claim could be made on the department, even if the earnings of the extra cars did not reach the amount of the guarantee.

The arrangement did not apply to special cars ordered for taking a full carload from a single point.

The subsidy, or guarantee, was given to secure a regular service for shippers of comparatively small lots, who would otherwise be compelled to pay for a whole car, or hold the butter until a carload was accumulated, in which case there would be serious deterioration in the quality of the butter.

Inspectors were employed going over the refrigerator car routes, reporting regularly on the working of the service, and endeavouring to have defects in the handling of the butter remedied as promptly as possible, whether they occurred at the creamery, in the hauling to the station, or while the butter was in charge of the railway company.

### REFRIGERATOR CARS FOR CHEESE.

The department agreed to pay the cost of icing 105 cars a week, distributed among the different railroads, for the carriage of cheese to Montreal from July 1 to September 12.

The railway companies agreed to furnish the cars, properly iced, upon application from shippers, for the transportation of cheese in carloads, up to the number allotted to each railroad. Although the summer was exceedingly cool, this service is reported to have been of great advantage.

### INSPECTION OF REFRIGERATOR CARS.

An inspector was stationed at Montreal, whose duty it was to examine both the cheese and butter cars as they arrived, and report on the condition and temperature of the contents, as well as the condition of the car as regards icing and cleanliness. Much useful information has been secured from this inspection. Weak spots in the transportation of perishable products have been discovered and pointed out to the responsible parties. If the cars on any route are found arriving short of ice, the railway officials are immediately notified. Creamery owners are notified of any shortcomings on their part. The presence of the inspector is a constant check on the employees of the railway and cartage companies, and promotes the careful and prompt handling of this class of freight. It is evident from the temperatures reported, that much of the butter is still delivered to the cars at too high a temperature.

The refrigerator car inspector paid particular attention to arrivals of early apples and tender fruits, carried in refrigerator cars, with and without ice. The fruit in un-iced refrigerator cars was not any cooler than that in ordinary cars, and it was often found to be as much as 10 degrees warmer than the air outside the car, a condition due, no doubt, to the heat generated by the ripening fruit, which was retained by the insulation of the car. The ice hatches are usually left open when the car is not iced, in order to provide ventilation, but the plan does not appear to be very effective. The temperature of the fruit, inside the packages, in many of these un-iced refrigerator cars was recorded as high as 78 degrees, while the highest temperature found in the fruit of a car properly iced was only 64 degrees, and varied down to 52 degrees. Some cars were inspected in which the ice had all melted and the interior had become very warm.

### COLD STORAGE AT CREAMERIES.

In 1897 I asked parliament to ratify an arrangement whereby any creamery owner who constructed a cold storage in connection with his creamery, would be entitled to a bonus of $100, payable in three annual instalments, if certain conditions were complied with. These conditions were (1) proper construction, according to plans and specifications furnished by officers of the department, (2) the maintenance of a low temperature throughout the period of manufacture, and the furnishing of reports giving a daily record of same, and (3) the manufacture of a stipulated quantity of butter during the season.

Up to the present time 496 creameries have received the first instalment of $50, 346 have also received the second instalment of $25, and 210 creameries have received the full bonus. A large number of applications have been refused because the requirements have not been complied with.

## SEED DIVISION.

### SEED INVESTIGATION WORK.

The work of this recently organized division has been directed with a view to encourage the production and more general use of high class seeds of all kinds. Upwards of 1,200 samples of seed of grasses, clovers, cereals, root crops, vegetables and flowers were secured from seed merchants in different parts of Canada and tested in the seed laboratory. Articles containing summary information of the results from the analyses of these seeds were prepared and sent to the newspapers for general publication. Details of the results of the investigation into the conditions of the trade in timothy, alsike and red clover seeds were also published in bulletin form and freely distributed to farmers.

## EDUCATIONAL WORK.

Educational work in the matter of good seeds has been carried on through the medium of farmers' institute meetings in the various provinces. Each of forty lecturers on agricultural subjects was supplied with information regarding the seed trade, as shown by the work of the seed division, together with a chart and a collection of the weed seeds commonly found in grass and clover seeds, to assist him in the presentation of an address. A great deal of interest has been aroused by the discussion at these meetings. The subject was extremely well received, and on account of having been somewhat neglected in the past, its representation was timely and conducive to good results.

In order to further bring the advantage of using seed of the best quality to the attention of farmers, I authorized the preparation of an exhibit of seeds of various kinds and qualities, that would clearly illustrate the actual value, and the dangers that arise from the use of inferior grades. This exhibit was shown at thirteen agricultural fairs. It proved to be exceedingly instructive, and a great deal of interest was taken in it by farmers, as shown by their desire to get information relative to seeds from the officer in charge.

Compared with previous years, there has been a greater demand on the part of farmers for higher grades of grass and clover seeds, and I have been assured by several of the wholesale seedsmen that this is due mainly to the efforts of the department through the seed division.

## BILL RESPECTING THE 'INSPECTION AND SALE OF SEEDS.'

Early in the year I instructed the officer in charge of this work to make a special study of the conditions of the trade in agricultural seeds, with a view to obtain further definite information that would assist me to make perfect the Bill respecting the 'Inspection and Sale of Seeds,' which I introduced in Parliament during the recent session. This Bill, with the exception of two clauses which are of minor importance, was accepted by the Committee of the Whole, and it is my intention to take it up for reconsideration early in the session of 1904. In the meantime it has been reprinted in bulletin form, together with some explanations, and distributed to farmers and seed merchants.

The object of this Bill is to place the commerce in agricultural seeds on a better and more legitimate basis. Under the present conditions of the seed trade in Canada, competition is largely confined to the matter of prices. This state of affairs is antagonistic to the best interests of farmers who produce, and merchants who endeavour to supply, the best quality of seed. There is abundant information to show that the seed trade has been an exceedingly fruitful medium for the spread of noxious weeds throughout Canada, and an endeavour is being made to suppress this evil as far as practicable. The seeds of many species of noxious weeds are very small and difficult to detect among grass, clover and other small agricultural seeds, and it has been considered wise to make provision in the Bill for the uniform grading of the principal grass and clover seeds sold in Canada, so that those which are represented to be of first quality will not contain the seeds of the several species of noxious weeds that are named in the Bill.

### DISTRIBUTION OF REFERENCE COLLECTIONS OF WEED SEEDS.

Seed merchants, as a rule, are unable to identify the noxious impurities in the seeds they sell, and in consequence, many of the existing evils of the trade are brought about unwittingly on their part. In order to give them some material assistance with the identification of seeds, I authorized the preparation of authentic reference collections of 100 species of seeds of noxious and useful plants, for distribution to seed merchants at a nominal cost. With these reference collections in their possession, seed merchants are able to determine the species of weed seeds that are present as impurities in the seeds they sell. A large number of these collections of seeds have been supplied to Canadian seed merchants.

### TESTING SEEDS FOR FARMERS AND SEED MERCHANTS.

In addition to the investigation work carried on, a large number of samples have been tested in the seed laboratory for farmers and seed merchants, who desired information regarding their purity and vitality. It is encouraging to note that the interest taken in seed testing has rapidly increased, and doubtless much benefit will arise from this work. In the seed laboratory the testing of seeds for farmers is given precedence over all other work, and a strong effort is made to have them supplied, with the least possible unnecessary delay, with detailed information regarding the seeds which they send in for analysis.

### SPRING SEED FAIRS.

Early in the year the chief of the seed division completed arrangements with several agricultural societies in the eastern provinces, for the holding of annual spring seed fairs. The object of these fairs is to provide a special market day during the early spring for the sale and exchange of seeds among farmers. In a few localities in the province of Ontario these seed fairs were established several years ago, and they have proved to be an exceedingly valuable medium for farmers who desire to sell, purchase, or make an exchange of seed grain. Seed fairs were held for the first time, in the months of March and April, at Charlottetown, P.E.I.; Truro, N.S.; Woodstock, N.B.; and Sherbrooke, Que. The agricultural societies at each of these places gave prizes for the best lots of seed that were brought out in quantity for sale. The officer in charge of the seed division co-operated with the various agricultural societies in arranging the prize lists and circulating information regarding the fairs. He also awarded the prizes and delivered lectures on topics relating to seeds and kindred subjects. All the fairs were well supported, and a desire was expressed by many farmers, and by the officers of the societies, to have them continued and their usefulness extended.

### MACDONALD-ROBERTSON SEED GROWERS' ASSOCIATION.

The seed grain competition, for which Sir William C. Macdonald, of Montreal, provided cash prizes through Professor Robertson, closed with 1902. In the spring of 1903 many of the farmers who were directly interested in that competition expressed a desire to extend the work of producing high-class pure seed grain, by forming an association of seed growers, and continuing the system of growing and selecting seed grain that was adopted by the competitors in the seed grain competition. A pamphlet was issued early in March announcing the formation of the Macdonald-Robertson Seed Growers' Association, and extending an invitation to all farmers who make seed growing a special industry in their farm operations, to become members of the association. According to the rules of this association, seed grain that is pure, true to variety, and has had the benefit of careful growing and continued selection for three consecutive years, is recognized as improved seed. The advantages to be derived from organized effort on the part of seed growers are not dissimilar to the advantages which breeders of pure bred live stock get through the medium of their associations, and the general operations of this organization of seed growers will be carried on in a manner similar to those of live stock associations. It is evident that there is much need for a few farmers in every agricultural locality in Canada to make a specialty of growing high-class seed grain in quantity for sale. All farms, of various kinds and conditions of soil, are not well adapted for the production of seed of superior quality. Grain, or other seeds, intended for seed purposes, should be produced on lands that are free from noxious weeds and capable of producing those crops at their limit of perfection. It is the intention of the association to issue an annual catalogue for distribution, in which the kinds and varieties of seed produced, and the pedigree of the seed, will be published together with the names of the members of the association who produce them, the amount of each kind of seed for sale, and the market price for same. I believe that there is wide scope for exceedingly useful service for this association of seed growers, and I have authorized that the Department of Agriculture render such assistance as may enable the association to carry on efficient work.

## POULTRY DIVISION.

### CHICKEN-FATTENING STATIONS.

The illustration chicken-fattening stations in operation this year are located at Sandwich, Ont. ; Stanfold, Que. ; Rogersville, N.B. ; East Amherst and North East Margaree, N.S. ; and Alberton, Eldon, Glenfinnan, Montague Bridge and Mount Stewart, P.E.I. The operator of each station purchased ordinary chickens from the farmers. The chickens were fatted in lots. Each lot consisted of from two hundred to seven hundred chickens. The average gain in live weight per chicken was from one to two pounds.

In order to create a greater local demand for crate-fatted chickens, and to develop home markets, I directed that the fatted chickens be sold to produce merchants in Goderich, Bowmanville and Toronto, Ont. : Montreal, Que.; St. John. N.B.; Amherst, Halifax, Sydney, North Sydney and Glace Bay, N.S.; and Charlottetown, P.E.I. These sales were most satisfactory, and the merchants were pleased with the increased flesh and the improved flavour of the chickens. Since the chickens that are fatted at the stations have been offered for sale in Canada, I notice each year an increased difference in the price per pound paid for fatted and for ordinary chickens. At the present time one Toronto firm pays five cents per pound more for crate-fatted chickens than for ordinary chickens. The result of these sales confirms my expectation that the local demand for fatted chickens will increase rapidly, and that the fattening of chickens by the farmers for local consumption can be extended with much profit.

Illustration shipments of chickens from the fattening stations have each year gone forward with success to Great Britain: commercial firms throughout Canada have exported large shipments of chickens, some of them under the direction of my department. On account of the increased local sales of fatted chickens, there will be a decrease in the number of chickens shipped from the fattening stations to Great Britain. A Manchester (England) commission merchant purchased 68 cases from my department for his Christmas trade. This merchant visited Canada about December 1st. He bought a great number of chickens and other poultry; good prices were realized. After a careful consideration of the favourable impression which crate-fatted chickens have made in Great Britain, and of the letters from large commission merchants making inquiries for thousands of similar chickens next year, it appears that the exporting of fatted chickens can be developed to an almost unlimited extent.

The style of shipping case in use at the illustration stations has been adopted by the exporting firms. The cases are made in five different sizes and hold twelve chickens weighing from two and one-half to five and one-half pounds each.

### CHICKEN REARING STATIONS.

There are three illustration chicken-rearing stations in operation. They are at Chicoutimi, Que.; Andover, N.B., and Vernon River Bridge, P.E.I. The operators of these stations purchase Plymouth Rock eggs for hatching from the farmers, and illustrate the artificial methods of hatching and rearing chickens. Eggs are also supplied from utility-type Plymouth Rocks and the chickens hatched are sold to the farmers.

### POULTRY BREEDING STATIONS.

The poultry breeding stations are at Holmesville and Bowmanville, Ont., and Bondville, Que. At each of these stations a model poultry house is erected and 100 utility-type Barred Plymouth Rock pullets and 10 cockerels are housed. In the winter the eggs are sold to dealers. During the breeding season the eggs are placed in incubators. A limited number of eggs are sold to the farmers at 25 cents per dozen. The chicks hatched are reared in brooders and movable houses. Valuable information was obtained regarding the hatching of the chickens, and the nature of the feed required for rapid growth.

There was a great increase in the demand for utility-type chickens. I learn that over 1,000 chickens have been sold from the three poultry breeding stations. The price per chicken was 50 cents. The chickens arrived in good condition and have given satisfaction.

The chief of the poultry division and the operators of the stations have attended and addressed agricultural fairs, institute meetings and poultry exhibitions in the different provinces. The practical information imparted in this way has proven of value.

A revised edition of 'Profitable Poultry Farming,' which deals with the construction of poultry houses, the work of hatching, rearing, fattening and marketing chickens, and the care of poultry, was published and circulated extensively.

## EXTENSION OF MARKETS DIVISION.

### EXPORTS OF CANADIAN FARM PRODUCTS.

During the past seven years Canada's export trade in agricultural and animal products has grown at a wonderful rate. Following are the comparative figures for the years 1886, 1896, and 1903:—

Total exports of Canadian agricultural and animal products in the years ended June 30, 1886, 1896 and 1903:—

| | |
|---|---|
| 1886 | $ 39,718,212 |
| 1896 | 50,591,002 |
| 1903 | 114,441,863 |

The above figures afford striking evidence of progress; and if the ratio of increase of the past ten years is continued, the extension of markets for our farm products will each year become more important.

Although the British market now absorbs the great bulk of our exports of farm products it still offers a vast field for the further enlargement of Canadian trade.

The following comparative statement shows the value of the exports to all countries of some Canadian farm products in 1903; also the total value of the imports of similar products into Great Britain in 1902:—

| Value of some Canadian Farm Products Exported in the Year ended June 30, 1903. | | Value of Products of the same Sort Imported into the United Kingdom from all Countries in the Year ended December 31, 1902. | |
|---|---|---|---|
| | Dollars. | | Dollars. |
| Butter | 6,954,618 | Butter | 99,902,612 |
| Cheese | 24,712,943 | Cheese | 31,207,111 |
| Eggs | 1,436,130 | Eggs | 30,659,679 |
| Poultry—Dressed and undressed | 160,518 | Poultry and game | 5,154,092 |
| Bacon, hams and pork | 16,029,269 | Bacon, hams and pork | 92,650,146 |
| Wheat | 24,566,703 | Wheat | 131,682,505 |
| Flour | 4,699,143 | Flour | 43,545,701 |
| Oats | 2,583,151 | Oats | 24,534,429 |
| Oatmeal | 537,002 | Oatmeal | 2,365,521 |
| Pease | 1,052,743 | Pease | 3,247,215 |
| Barley | 457,233 | Barley | 34,704,161 |
| Hay | 3,595,665 | Hay | 6,618,415 |
| Cattle | 11,342,632 | Cattle | 38,031,797 |
| Sheep and lambs | 1,655,681 | Sheep | 2,211,520 |
| Apples—Green or ripe | 2,758,724 | Apples—Green or ripe | 9,360,946 |
| Total | 102,542,155 | Total | 555,875,850 |

Taking the fifteen classes of products given in the above table, it will be seen that, in her biggest year, Canada supplied less than one-fifth of Great Britain's requirements. The above figures illustrate the enormous demands of the British market and the small share, relatively, yet secured for Canadian products. To obtain a larger share of this market it will be necessary to pay careful attention to the following points: Superiority in quality; regularity in supply; ability to sell at as low a price as competing countries; and the use of attractive packages of the kind demanded by the market.

Apart from Great Britain, the other markets most promising are South Africa, Japan, China and the British West Indies.

Since the establishment of a direct steamship service between Canada and South Africa a very encouraging trade has been developed. Each monthly steamer carries large shipments of grain, flour, provisions, &c., and, as soon as the commercial depression engendered by the war and still felt in South Africa, is removed, Canadian exporters of foodstuffs will be in a good position to share in the expansion of that market.

Hard wheat flour is the principal agricultural product exported from Canada to Japan, and this trade has been stimulated by the practical and successful exhibit of Canadian flours made by my department at the Osaka exhibition, early in 1903. In the last year there has also been a notable increase in the exports of Canadian butter to both Japan and China—mainly from the creameries operated by my department in Alberta. The butter is mostly packed in tins, a proportion, however, going forward in 14 and 28 pound boxes.

The British West Indies furnish a market of considerable importance for Canadian food products, especially for flour. Recently a paragraph appeared in the Canadian and British press to the effect that Canadian flour had a bad reputation in the West Indian market, owing to its poor keeping qualities. I caused this statement to be inquired into, and found that, as far as the leading brands of Canadian flour are concerned, it was entirely unfounded. Undoubtedly some Canadian shipments have been complained of, but the flour was usually the product of small mills and had been manufactured and packed without regard to the special requirements of the West Indian markets.

### VARIOUS FOOD PRODUCTS.

Our exports of cheese have received a great impetus in the past few years, and Canadian Cheddars are steadily gaining in favour in the British markets. For the year ended June 30, 1903, our exports were the largest in our history; but the current year promises an even better showing, the value of the exports of cheese for the months of July, August and September, 1903, being $10,327,439, against $8,376,940, for the three corresponding months in 1902.

A good deal has been done in recent years to improve the transportation facilities for our export butter trade, so that to-day Canadian butter is carried in cold storage from the time it leaves the creamery until it reaches the British docks. To reap the full advantage of our chain of cold storage transportation it is apparent that the butter should go into cold storage as soon as it is landed in Great Britain. Instead of this, however, it is often allowed to remain on the quays at Liverpool and Glasgow for several days, greatly to its detriment. In one case eleven days elapsed before a shipment of Canadian butter was removed from the Glasgow docks. Lists showing the landing and delivery dates of butter ex Montreal steamers at the above named ports, have been compiled and laid before the produce associations of Montreal, Liverpool and Glasgow. The matter has also been ventilated in the Canadian and English trade papers, and the British importers urged to take delivery of Canadian butter as soon as discharged from the steamers.

Shipments to England of Canadian butter packed in casks (the Danish kiel) have been a feature of the export trade this year. Usually there were no marks or brands on the casks, but in one shipment the packages were marked with a Danish name. This lot was stopped by the British Customs authorities until the name was erased. The butter shipped in casks was generally of fine quality and doubtless ultimately reached the British consumer in the guise of 'Choicest Danish.' While this practice is not to be commended, it is a tribute to the quality of Canadian butter, when consumers in Britain are unable to distinguish between the Canadian and the Danish article if both are put up in the same style of package.

Canadian apples have easily taken first place in the British markets this year, and have realized good prices.

## THE FRUIT DIVISION.

The Fruit Marks Act has grown steadily in popular favour as its provisions become better known, and it is generally accepted as having been a most beneficial piece of legislation. This is evidenced by frequent press references, and by the expressed opinions of leaders in the trade; while the fact that the Fruit Growers' Associations of Ontario and Nova Scotia have suggested no amendments, shows that the present Act is fairly satisfactory to the producers. There have been some requests for a statutory definition of the second quality of fruit, the Act, as it now stands, defining only the first grade.

The work of inspection continues to show excellent results in improving grading and packing, and the greater reliance which the trade are now able to place on the marking of the packages. The inspection at ports of export has been of material assistance to shippers. They have been advised of careless work on the part of their packers, of defects in packages or in the carrying quality of the fruit. These advices have enabled them subsequently to avoid similar mistakes and losses.

The inspectors, moreover, have kept a close watch on the handling of fruit from cars to steamers; and have successfully urged upon those in charge the adoption of improved methods of handling and stowing the packages.

In the matter of small fruit in baskets, an effort has been made, with some success, to induce private citizens to avail themselves of the protection afforded by the Fruit Marks Act, by prosecuting sellers of fraudulently packed fruit, without relying upon an inspector. Market inspectors, appointed by municipalities, have also instituted successful proceedings under the Act, with marked effect.

During the spring and early summer, the inspectors were engaged in holding orchard meetings, where all branches of practical fruit-growing were discussed, and demonstrations given in pruning, grafting and spraying.

Fall fairs were attended so far as inspection work permitted, and the subject of packing and packages was discussed with growers, practical illustrations being given. A special exhibit was made by the fruit division at the Dominion exhibition in Toronto, where many kinds of pear and apple packages were shown, and their merits discussed.

The fruit inspectors again assisted the Provincial Farmers' Institutes at their winter meetings, with gratifying results in the matter of attendance and interest.

The evidence of the chief of the fruit division, as given before the Select Standing Committee on Agriculture and Colonization, dealt chiefly with the export trade, and with the requirements of British markets, giving the results of his investigations in the United Kingdom last year. This evidence was printed by order of Parliament, and has been widely distributed.

Bulletins were also issued dealing with the export apple trade and export pear trade, respectively, and including a copy of the Fruit Marks Act.

To encourage more general and efficient spraying by small growers, a number of orchards were sprayed throughout the season by means of a power outfit, operated by gasoline, under the direction of the fruit division, the growers paying rather less than the actual cost of the operation. Exceptionally good results were obtained, and the advantages of co-operative power spraying were demonstrated.

A serious drawback, however, in our export apple trade is the large number of varieties sent forward in each shipment. Canadian orchards are planted with too many varieties, and our growers are suffering financially in consequence. Consignments of one well known variety, of uniform grade, are wanted by the large dealers in Great Britain, while small lots composed of different varieties and grades are bought by small dealers at reduced prices.

Canadian eggs have now an excellent reputation in Great Britain. This year our exports to that market included several shipments of tinned eggs, which I understand turned out satisfactorily. A good market exists in South Africa for tinned eggs, and Canadian exporters should endeavour to secure a portion of this trade, now being supplied from Russia, Germany and Denmark.

## INSPECTORS AT PORTS.

Four inspectors were again appointed at Montreal, for the season of navigation, to observe and report concerning the condition of Canadian food products when loaded on the steamers, the handling on the wharfs and in process of loading, and the stowage in the ships. During the season they furnished detailed reports of the shipments of cheese, butter, eggs, bacon, poultry, fruit, &c., forwarded in 291 sailings of steamers, as follows:—

| | | |
|---|---|---|
| For Liverpool | 82 | sailings. |
| " London | 64 | " |
| " Glasgow | 63 | " |
| " Bristol | 39 | " |
| " Manchester | 24 | " |
| " Leith | 11 | " |
| " Cardiff | 8 | " |
| Total | 291 | " |

A feature apt to be overlooked, in connection with the work of these cargo inspectors, is the check their presence entails on rough handling by the carters, or the stevedore's men. The handling of the cargo from the time it is brought into the sheds until it is stowed in the holds of the ship, is done under the eyes of one of the department's inspectors; and should he find, say apples or cheese being handled by a carter or ship's labourer in a rough, careless manner, he cautions the man, and if the warning is not sufficient, he reports him to the ship's agents, which action always effects the desired reform. A word of warning, however, is usually sufficient, as the inspectors are now well known and their official standing generally recognized.

Officers of the department are also stationed at Liverpool, Manchester, London, Bristol and Glasgow. They are instructed to observe carefully the handling of perishable products in the unloading of the steamers, and to report fully to the department. They are also instructed to do everything possible that will make for improvement in the safe discharge of cargo, and to advise the officials of the steamship lines of any rough work that may come under their notice. When their reports to the department indicate, as they too often do, a lack of care in the packing of some particular shipment, the inspector's remarks are transmitted to the shipper for his information. Should, however, a report show that perishable goods have been landed in a damaged condition, due to causes controlled by the steamship people, the department at once communicates with the line concerned and endeavours to have them remedy the matter forthwith. Continuous efforts are thus being put forth by the department to better existing transportation conditions, and a great deal of correspondence is necessarily exchanged with the steamship companies in this connection. Last season, owing mainly to representations by the department, several steamers carrying apples were fitted with additional ventilating trunks in the ordinary holds, and minor improvements were also effected in the cold storage chambers carrying tender fruit.

## LIVE STOCK DIVISION.

During the past year, the efforts of the live stock division have been devoted to the prosecution and extension of those lines of agricultural progress that had already been begun; namely: sales of pure bred stock; extension of the Farmers' Institute system; the improvement of agricultural exhibitions, by extending the system of expert judging, the discouragement of attractions that are non-educational in character, and the introduction of features that are essentially educative; the publication of press articles, and the preparation of bulletins. A bulletin on the swine industry in Canada is now prepared and ready for the press.

### BRITISH COLUMBIA.

In British Columbia live stock judges were again furnished for all the fairs. These report steady progress and increasing appreciation of the system of expert judging. After the fair season was over, the judges assisted in conducting a series of ininstitute meetings covering the greater part of the farming and ranching district of British Columbia. In all, 54 very successful meetings were held. The speakers report that the attendance was very gratifying and that lively and profitable discussions followed the addresses delivered.

### NORTH-WEST TERRITORIES.

The work in the North-west Territories was similar to that done in British Columbia and the other provinces. Judges were sent to a number of the exhibitions and after the fair season was over, these men remained for a time and conducted a series of institute meetings. A very successful auction sale was held at Calgary in connection with the territorial live stock associations; 268 animals were sold at very satisfactory prices, averaging $96.38. A stallion and cattle show was held in connection with the sale, which brought out a fine exhibit of stock; and the live stock conventions which were addressed by the judges, were attended by large audiences of interested and appreciative stockmen.

### MANITOBA.

In Manitoba the work has been systematized by the appointment of Mr. George H. Greig of Winnipeg, as secretary of the Live Stock Associations, and representative of this division in that province. Mr. Greig is thoroughly acquainted with the needs and conditions of the west, and is in close touch with all the forces that make for progressive agriculture. He is devoting all his time to the live stock interests and farmers' institutes, and is doing very effective work.

During the month of February, two short courses in live stock judging were held at Winnipeg and Brandon under Mr. Greig's direction. Expert judges were furnished by the live stock division, who not only conducted the classes in judging, but also gave addresses on various subjects of interest to live stock men. These classes were largely attended and the keenest interest was manifested in the proceedings throughout.

The live stock associations of the province have been placed on a better working basis, and the constitutions revised to bring them into conformity with the live stock associations of the other provinces.

### ONTARIO.

In Ontario the work in connection with the live stock associations and farmers' institutes is so well organized and in such good hands that it has not been found necessary to render very much assistance from this division except to strengthen the hands of the officers of the provincial department of agriculture.

Under the joint auspices of the Dominion Live Stock Associations and this division, an auction sale of pure-bred stock was held in Guelph. This sale was a pronounced success; in all, 77 animals were sold at prices ranging from $35 to $275, averaging $83.58. Another sale was conducted in Ottawa at which 25 animals were sold at prices ranging from $37 to $150, an average of $107.88.

The principle of public auction sales inaugurated by this division has been so successful that it is now being copied on quite an extensive scale by the breeders themselves. Noting the success of the sales at Guelph and Ottawa, a number of the breeders of Ontario conducted a combination sale in March, 1903, in Ottawa, at which 41 animals were sold at prices ranging from $35 to $175, an average of $99.32. The lowest price named, was for a bull calf of less than two months old. Several other sales have been held at Campbellcroft, Guelph, Port Perry, and elsewhere, by private enterprise; all of which have been satisfactory and mark a step in advance of old time methods of the disposal of surplus stock.

With the assistance of the live stock commissioner, 'model fairs' were again conducted at Whitby and Richmond. From these fairs, everything that was non-educational in character was eliminated, and in every particular they were made to conform to modern ideals of what an agricultural fair ought to be. Expert judges were furnished for each department of the fair. These men explained the reasons for their awards, and, when time and circumstances would permit, pointed out and commented on some of the excellencies and defects of, at least, a few of the exhibits in each class. This method has given the best of satisfaction both to the exhibitors and to the spectators.

Illustration plots were again arranged in which were grown a number of the most promising varieties of corn, clover, grass, fodder crops, mangolds, turnips, sugar beets, &c. This feature of the fair attracted much attention and proved to be both interesting and instructive.

By way of attraction, encouragement was given to good, clean, amateur, athletic sports of various kinds. In this connection a gymkhana was held at Whitby, which proved to be a very amusing and interesting novelty with all of the desirable and none of the deplorable features of the usual horse racing, which it was designed to displace.

The desirability of interesting the children in the agricultural fair system has not been overlooked. With this in view prizes were offered at several fairs to the teachers and pupils of a public school section making the best exhibit of (1) cut flowers grown in the school grounds; (2) grain in straw; (3) clover and grasses; (4) roots, fruits and vegetables; (5) wild flowers and leaves of trees; (6) weeds and weed seeds (7) beneficial and injurious insects; (8) native woods. This plan has proved effective in inducing the children to begin the fascinating study of nature, directed towards the elements of general agriculture, economic botany and entomology.

This division has had many gratifying expressions of approval both from teachers and parents of children that have taken part in an exhibit of this kind. Nothing else stimulates to effort like the prospect of competition. Children are in this way incited to take up, with enthusiasm, interest, and pleasure, the study of the open book of nature, with all its attendant advantages.

### QUEBEC.

Fifteen speakers were sent out by this division who addressed a series of 98 institute meetings in the province of Quebec. These meetings were well attended and provoked lively discussions, and were in every respect much in advance of anything that has heretofore been done in this direction in the province.

Expert judges were sent to four of the leading fairs in the province and were well received. Here, as elsewhere, the systm of sending expert judges who give the reasons for their awards, is growing in favour.

Steps are being taken to organize the live stock men of Quebec on the same basis as the live stock associations of Ontario. This movement is meeting with the hearty approval of the leading stock breeders of the province.

### NEW BRUNSWICK.

Judges were again sent by this division to some of the principal fairs of the province. The live stock commissioner was unable to supply judges for all the societies that asked for them. The demand has been so great from the various provinces that it has been exceedingly difficult to find enough competent men to do the work.

Three men were sent to New Brunswick to assist in farmers' institute work. These men addressed 105 meetings, and report that the meetings were well attended, and that a growing interest in farmers' institute work was manifested. A number of speakers were also furnished for the annual convention of the New Brunswick Farmers' and Dairymen's Association, which met at Woodstock, on January 26, 27 and 28, and at Sussex on January 29 and 30.

### NOVA SCOTIA.

A winter fair was conducted at Amherst in December on similar lines to that at Guelph. Judges were sent by this division and addresses were given on various topics of interest to live stock men. This fair was an unqualified success and a marked improvement on the one held two years ago. The live stock men of the province are taking the matter up with enthusiasm and zeal and the attendance was so large that the commodious building provided by the town of Amherst at a cost of $13,000 was crowed to its limit.

Farmers' institute work also has been conducted in Nova Scotia with marked success. The results of the advocacy of better methods through farmers' institutes and other channels, has been to awaken a lively interest in improved agriculture, and especially in the keeping of more and better live stock. Men that were openly hostile two years ago to any advance along the lines of live stock associations and farmers' institute development are now expressing themselves as in hearty sympathy with the movement, and are lending a willing hand to push the work along.

### PRINCE EDWARD ISLAND.

Judges were sent to the provincial exhibition at Charlottetown. Speakers were also sent to assist in conducting a series of institute meetings throughout the province. Twenty-eight very successful meetings were held with an average attendance of 70. Prof. MacMillan, of Charlottetown, the provincial secretary of agriculture, expresses himself as highly gratified with the success of the meetings, and says:—'The majority present were representative men, who manifested a close interest in the subjects under discussion. No time was taken up with light entertainment of any kind, and much good work was done.'

## EXPERIMENTAL FARMS BRANCH.

The experimental farms continue to form one of the important branches of the work conducted by my department. Their influence is far-reaching and the benefits they confer, by giving assistance and helpful information on every hand to those engaged in agriculture and horticulture, are felt and appreciated in all parts of the Dominion. The experiments and investigations conducted in all the divisions of this work are so arranged as to have a practical bearing on farming affairs, and the experience gained is widely distributed, in the Annual Reports and Bulletins, among those who are engaged in developing the agricultural resources of the Dominion. These publications are full of valuable information and, under my instruction, are sent to all who apply for them. Gratifying testimony as to their value and usefulness comes from every section of the country, and many farmers attribute a large measure of their success to the practical information which has been thus supplied to them. The very large and constantly increasing correspondence conducted by the officers of the experimental farms with farmers seeking advice and information, has also been productive of much good. Those who have participated in these and other benefits conferred by these institutions have become much interested in the work carried on at the farms and value the records of this work in the publications issued, very highly.

The examples given by the experimental farms in methods of cultivation of the land, its treatment to regulate and influence soil moisture, in rotation of crops, in demonstrations regarding varieties of grain and other important farm crops most profitable to grow, and of fruits best adapted to the varying climates of different parts of Canada, are all exceedingly helpful and serve to awaken thought and encourage enterprize among farmers everywhere.

### CO-OPERATIVE EXPERIMENTS AMONG FARMERS.

The large annual distribution of samples of grain for the general improvement of farm crops has been continued. These wide-spread co-operative tests, in which about forty thousand farmers throughout the Dominion are annually engaged, have an educating and stimulating influence on the community and result in much benefit to the country. Under my instruction, the weight of the samples of oats sent out has been increased to four pounds, and those of barley and wheat to five pounds each, which is sufficient to sow one-twentieth of an acre in each case. In the returns given by the farmers of the results of their tests, the quantity now supplied enables them to give the yields of the several crops per acre, information most useful to all concerned.

The magnitude of this work is perhaps not fully and generally understood. Last year the total number of samples distributed was over forty thousand, involving the use of about seventy tons of the choicest and purest seed obtainable. The greatest care is taken to have this seed true to name and thoroughly clean, and many grateful acknowledgments are received from farmers every year of the benefits conferred on them by this distribution. In many instances, with tests of the more prolific sorts of oats, the twentieth of an acre has produced from four to five bushels, and this quantity, sown the following season on from two to two and a half acres of land, has, in some instances reported, given the experimenter 200 bushels or more, sufficient to sow thereafter a considerable acreage for himself and provide a surplus to sell to his neighbours, and all at no cost to himself beyond that of his own labour.

With the great influx of new settlers in the country, who have much to learn, the helpful influence of such work is impossible to estimate. By the pursuit of this method the best and most productive varieties of the more important farm crops find their way into the remotest corners of the Dominion, producing bountiful returns. Evidence of the good effect of this work is found in the increase of the average production of grain from year to year in the different sections of the Dominion. This improvement in average yield is particularly noticeable in oats, which have now become the most important grain crop in the eastern provinces. The extensive use of this valued cereal has had an important influence in building up the trade in fat cattle and swine as well as in the extension of the dairy and poultry industries.

### MAINTAINING THE FERTILITY OF THE SOIL.

The experiments carried on in the ploughing under of clover, as a fertilizer for the soil, have produced in almost every instance such marked improvements in succeeding crops that intelligent farmers in many districts have followed the example of the farms in this respect, with much profit. The tests, began many years ago to gain information as to the relative influence of the application of natural and artificial fertilizers on the more important farm crops, have been continued and many useful lessons have been learned in this connection. The problems connected with the maintaining of the fertility of the land lie at the very foundation of successful agriculture, and are among the most important which can engage our attention. Much thought and care have been bestowed in working out for the guidance of farmers the most economical and practical methods to adopt to secure this end.

### THE BREEDING OF NEW CEREALS.

Some excellent results have been obtained in connection with the cross-breeding of cereals, in the production of earlier maturing varieties of high quality, which it is hoped will extend the area of wheat-growing in Canada and permit of the profitable growth of this important cereal in some districts where, owing to the shortness of the season, it has heretofore been an uncertain crop. In this field of labour the outlook seems full of promise, and under my instruction the work is being extended. A new division has been organized of cereal breeding and experimentation, which will result in a considerable enlargement of this important branch of work, from which we may look for increased benefits in the future.

### THE BREEDING OF HARDY APPLES FOR THE NORTH-WEST.

Satisfactory progress has been made in the cross-breeding of hardy apples for North-west country. Several of the new sorts which have fruited for the first time this year, are superior in size and quality to any heretofore grown. The results thus far achieved point to an early solution of the problem of providing apples hardy enough to endure the climate in most of the settled portions of the Dominion, and of such size and quality as to be useful for all domestic purposes.

Fuller particulars along these lines will be found in the Annual Report of the Experimental Farms, which forms an Appendix to my Report.

## DIVISION OF AGRICULTURE AND LIVE STOCK.

In the agricultural division the work carried on during the past year has been along the lines of (*a*) Study of methods of soil cultivation and (*b*) Study of comparative values of different crops as food producers for cattle, sheep, and swine.

*The soil.*—The work in soil improvement has been along the lines of cultivation and of rotations of such character as to improve the physical condition and increase the humus content of the fields handled. Shallow, early fall ploughing with deep cultivation is being compared with deep late fall ploughing and shallow cultivation.

Information of great value is being secured along this line and is being disseminated by means of bulletins, reports, and addresses among the farmers of Canada.

*Crops.*—The field crops possible of cultivation in Canada are grown and a study of the cost of production of the same and of their comparative economic value as food producers is being made.

### ANIMAL HUSBANDRY.

Dairy cattle, beef cattle, steers, sheep and swine are bred and fed to a considerable extent.

They are used to determine both the comparative value of animals of different types and breeding as well as the value of different forage plants for the production of milk or flesh.

*Dairy Cattle.*—Herds of pure bred Ayrshire, Canadians, Guernseys and Shorthorns as well as small grade herds of each breed are being fed under similar conditions to gain some information as to the comparative value of cattle of the characteristics well known to be possessed by the breeds above mentioned, as milk producers or dual purpose cattle.

A record of the year's work with these herds may be found in the report of the Experimental Farms for 1903.

*Steers.*—The study of the comparative economy of feeding three-year-olds, yearlings or calves for beef production, as well as the comparative study of the feeding of steers loose *vs.* tied is being continued.

*Swine.*—Economical production of firm bacon continues to be the aim of all experimental work with swine : roots and different kinds of pasture are being tried and different methods of preparation of food as well as the value of different rations inquired into.

*Sheep.*—Leicesters and Shropshires are the breeds kept. The lamb crop was good in the spring, but owing to the drought in May and June the young progeny did not all develop into first-class animals.

## DIVISION OF HORTICULTURE.

Most of the important experiments which have been conducted in the horticultural division during recent years were continued this season, as it is believed that the value of results of an experiment is increased the oftener the experiment is repeated. Some new and interesting experiments were also begun.

*Large Fruits.*—The sixteen years' experiments with large fruits at the experimental farm have furnished a vast amount of information regarding varieties and their methods of cultivation, and the publishing of the results obtained has done much to encourage fruit growing, especially apply culture, in the provinces of Ontario and Quebec.

*Apples.*—Although the apple crop on the experimental farm was not as large this year as last, the fruit was of good quality and a large number of varieties have borne fruit. Every year there is a large proportion of varieties fruiting which have originated in Canada, and it is the aim of the horticulturist to test all the promising seedlings which come under his notice, in the hope of obtaining some better and hardier kinds than those already on the market, and some of the seedlings which have fruited are very promising. A large number of seedlings of the best hardy varieties raised on the central fram have also been planted, and the first fruits were obtained this year.

*Plums.*—It has been well proven that the European plums, as a whole, are not satisfactory at Ottawa, as the flower buds are usually killed in winter and it is rarely that a good crop is produced. Canadian seedlings are, however, being tested which are hardier in this respect. Much attention is also being paid to the improvement of the native and American plums. A large number of varieties fruited this season. During the year a bulletin on plums was published, in which lists and descriptions of varieties and methods of culture were given.

*Cherries, Pears, and Peaches.*—None of these fruits have been satisfactory at Ottawa. The flower buds of cherries are destroyed in winter; pear trees are killed by blight, and the wood of peaches is killed back. It has been found that some of the low growing Russian cherries will produce fruit, as the buds are protected with snow.

Seedlings of these cherries are now being grown in the hope of getting some trees that are still hardier. Seedlings of the most blight-resistant pears are also being grown, and peach trees are being raised from varieties which ripened in the open at Lachine Locks, Que., and Orillia, Ont.

*Grapes.*—It was a very favourable autumn for ripening grapes, and a large number of varieties matured thoroughly.

*Strawberries.*—The strawberry crop was lessened very materially by spring frosts and by drought. Very useful information, however, was obtained regarding the relative hardiness of the different varieties when in flower, as some suffered much more from frost than others.

*Raspberries and Currants.*—Produced fair crops.

*Individuality of Fruits.*—The crop of fruit from each individual tree at the Central Experimental Farm is recorded every year, in order that one may tell at the end of a number of years just what each tree has borne. It has been found that there is a great variation in yield from trees of the same variety planted at the same time and under the same conditions. On tabulating five years' records, it was found that some trees had yielded from two to four times as much fruit as others of the same age. A co-operative experiment was planned in order to get fruit growers to investigate this matter for themselves, and a number have joined in the experiment. It is hoped that by propagating from the most productive trees a more productive strain will be obtained. Trees have been propagated at the experimental farm to determine this.

*Growing Vegetables under an inclosure Covered by Cheesecloth.*—An experiment was conducted this year by growing vegetables in a cheesecloth inclosure to determine what effect it would have upon them as regards earliness, tenderness, productiveness, &c. Owing to the unusually wet and cool summer, the test was not as satisfactory as it might otherwise have been. A few points, however, were determined, of which the following may prove very useful to market gardeners. It was found that radish and cauliflower inside the inclosure were not affected with the root maggot, while those outside were badly affected and the radish rendered almost entirely worthless. If maggots can be prevented from doing injury economically in this way it will mean much to those who grow radish, cauliflower and probably onions.

Many additions were made to the trees, shrubs and herbaceous plants in the arboretum and botanic garden this year, and additional information was obtained regarding the hardiness of those growing there. Some further planting was done in the forest belts, where certain kinds of trees had failed; close planting being adopted with the object of lessening the labour required to keep the trees from weeds and growing thriftily.

## DIVISION OF ENTOMOLOGY AND BOTANY.

The work of this division has been steadily increasing in a satisfactory manner. The large number of new settlers in the west find in their new homes many subjects concerning which they can obtain useful information from the entomologist and botanist. Inquiries concerning native plants and their suitability for fodder or medicine, and also as to their being a cause of possible danger in poisoning stock have been frequent. This is probably an outcome of the lectures upon weeds and poisonous plants which have been delivered in the west by the entomologist and botanist for the territorial department of agriculture during the past four seasons.

The practical study of entomology, or investigations into the life histories of useful and injurious insects, is one of the chief objects kept in view by the officers of this division, and effective work has been done in this direction. The entomologist was honoured last spring with an invitation to deliver a series of lectures upon economic entomology at Cornell University, Ithaca, N.Y. This was owing to the illness of the regular lecturer. Unfortunately, on account of the great pressure of the work in the division, this offer had of necessity to be declined.

At the request of the department of agriculture for the North-west Territories and of that for British Columbia, I was pleased to arrange for the entomologist and botanist to deliver addresses at series of meetings held during the summer along the Qu'Appelle valley and in Alberta, and later on Vancouver Island, in the Fraser valley, and in the Kootenay and Boundary country, B.C.

The entomologist and botanist has also, when his absence from Ottawa was possible, assisted at various meetings of farmers' institutes, exhibitions, fairs, &c., in eastern Canada, and his addresses have been listened to with satisfaction and profit, as witnessed by appreciative letters I have received from the localities visited.

The investigation of fodder plants of all kinds has been continued and experiments carried on to discover the suitability of grasses, legumes, &c., under different conditions of soil and climate in various parts of the Dominion. All the fodder plants recently introduced have been tested, and a great deal of useful information has been given to correspondents.

The collections of plants in the herbarium at the Central Experimental Farm, and of insects in the cabinets, have been largely increased during the past year, and are now valuable sources of reference for students, of which many avail themselves.

Much attention has been given to building up the collection of weed seeds in the division, and this collection now contains samples of nearly all the worst agricultural weeds of the country, and arranged in one-ounce bottles with metal screw-tops. These are convenient for reference.

The subject of weeds is one of which the importance has been much recognized of late, and the services of the entomologist and botanist have been made use of to a considerable extent in naming specimens and collections of weeds and their seeds, sent for identification; he has also acted as a judge at some of the autumn exhibitions, and has taken an active part in the recent and important Nature Study movement, in this connection delivering several addresses before teachers' associations and at farmers' meetings.

Among insects which have demanded special attention during 1903, mention may be made of the following :

*San José Scale.*—It is to be regretted that during the past season, although this rightly dreaded pest of the fruit grower, has not spread much into new districts, there has been a decided increase in the losses due to its attacks within the already infested area. The treatment, which up to the present time has given the best results, is to spray affected trees in winter with the well-known California wash of lime, sulphur and salt, or with modifications thereof, and in summer with the ordinary kerosene emulsion wash. If these recommendations are adopted regularly by fruit growers, trees can be kept clear of the San José Scale and good crops grown; but the treatment must be repeated every year without fail.

*The Oyster-shell Bark-louse.*—The ordinary bark-louse of the apple, which occurs wherever apple trees are grown, has as usual caused much loss. This insect can be controlled with comparative ease by means of the sprays recommended for the San José Scale and by spraying the trees during winter with a lime wash.

*Plant-lice on fruit trees.*—Several kinds of these insects occurred in numbers in different parts of Canada. The Apple-Aphis was abundant in bearing apple orchards, during the spring, and was the cause of some anxiety, though little injury resulted; the severest attacks were upon nursery stock, particularly upon such as was grown from buds or for budding. The Cherry Aphis appeared in large numbers on sweet cherries in western Ontario, but was in most places destroyed by its natural parasites before the crop had suffered seriously. The Pear-tree Flea-louse was exceedingly abundant and injurious in some pear orchards in western Ontario, and specimens were also received for the first time this year from Nova Scotia.

Grain crops throughout the Dominion were freer than usual from insect attacks. The Hessian Fly was notably less abundant than in former years. The Wheat-stem Maggot was only complained of in a few restricted localities. In Manitoba some loss occurred from locusts; but the provincial Minister of Agriculture promptly attended to the matter and distributed poison to all who applied; this was used most successfully in destroying the insects, the application made being the Criddle mixture, which has been strongly recommended in the recent reports of the entomologist. A widespread but not very important injury was observed in many places in the oat crop, which was caused by a minute insect belonging to the Thripidæ, that attacked the ovules of the forming grain, making it turn white without developing. The insect has not appeared for many years. The remedies recommended were the burning over of stubble and deep ploughing. The Grain Aphis, which occurred in large numbers in many places and attracted much attention, did comparatively little harm, considering its enormous abundance. The Pea Weevil was notably less destructive in 1903 than for many years past ; it is thought that this improvement is due to many farmers and seed growers having adopted the remedies recommended.

Forest and shade trees were not reported to have suffered seriously from insect enemies during the past season. The Forest Tent Caterpillar was hardly complained of; but the Fall Webworm is decidedly on the increase in many parts of Canada, and fruit growers and municipal authorities will do well to attend to this insect before it makes too great headway. The same may be said of the White-spotted Tussock-moth, which is disfiguring many of the shade trees in Montreal, Toronto and other cities.

The Horn Fly has been very troublesome in some districts; specimens were observed in the North-west Territories, and the insect was found to be annoying dairy herds to an injurious extent in Vancouver Island during the past summer.

## DIVISION OF CHEMISTRY.

As far as practicable, assistance of a chemical nature has been given to all the more important branches of agriculture, dairying, stock feeding, fruit growing, bee keeping, &c., by instituting special investigations, by the examination and analysis of soils, cattle foods, well waters, &c., forwarded by or procured from farmers and others, as well as by correspondence and addresses at conventions. The more important of these investigations and researches may be indicated as follows:—

*Dairying.*—Complete analyses have been made of about 150 butters made by an expert under known conditions of temperature, &c. This work was undertaken to ascertain the effect of certain factors or conditions of manufacture upon the composition of butter, and more especially upon its water content. The results will show to what extent the degree of ripeness of the cream, the churning temperature, the temperature of the wash-water, the rate of salting, the period or length of time between salting and working, &c., affect the butter, and thus furnish information that may lead to a greater uniformity in this valuable dairy product.

The nutritive value of certain concentrated feed stuffs, manufactured or sold in Canada, has been determined. In addition to various milling and other by-products, such as gluten meals and feeds, cotton seed meals, &c., a considerable number of brans and shorts from Canadian mills have been analysed. The report of this division for the current year furnishes much useful information on these matters, both for the dairyman and the feeder.

*Fruit Growing.*—Continuing the work upon the problem of soil-moisture conservation in orchards, data have been obtained this year emphasizing the value of cultivation and the preservation of an earth mulch to retard surface evaporation.

The fertilizing value of certain cover crops, such as the Hairy Vetch, Horse Bean, and Soja Bean has been determined, and the importance of such leguminous crops for the enrichment and general improvement of orchard soils indicated.

Certain newly introduced insecticides and fungicides have been critically examined, such as KNO Bug, Bug Finish, &c., and their merits for the prevention or protection from insect pests, reported upon.

*Beet Sugar Industry.*—The richness of sugar beets, grown in the various provinces of the Dominion, determined from beets grown on the various branch experimental farms and at other localities during the past year, has been determined. The information obtained from this yearly examination is eagerly sought for by those who are already growing beets for the factories, or who are considering the advisability of doing so.

*Bee-keeping.*—The researches in this connection during the past year have included the following: (1) the best conditions under which to store extracted and comb honey; (2) an examination into the nature of (so-called) aphidian honey; (3) the making of honey vinegar, and (4) the detection of beeswax adulterants.

*Waters.*—Well waters from farm homesteads and from creameries and cheese factories have been tested as to their purity. These included samples received from all the provinces, and it is confidently hoped that the results of this examination may be largely instrumental in exciting a keener interest in the matter of a pure water supply throughout the country generally.

*Chicken fattening.*—Incidental to the question of the relative digestibility of certain foods by poultry, certain results have been obtained as to the fattening properties of these foods, which will be found interesting and valuable to those preparing chickens for the home or English market.

## DIVISION OF CEREAL BREEDING AND EPERIMENTATION.

The work of this division has been, until recently, under the personal charge of the director who has succeeded in establishing a wide reputation for the Dominion Experimental Farms, both at home and abroad, by producing and by introducing to general cultivation new and valuable sorts of cereals of good quality and highly productive. For several years past, however, owing to the increased demand on his time from other branches of the work, the director had found it impossible to give to this division the large amount of personal attention which its great importance demanded. The work has, therefore, been put in the charge of a special officer, who devotes his whole time to it.

The investigations carried on in this division fall chiefly into two sections, (a) cereal breeding and (b) comparative tests of varieties of grain, field roots, &c.

*Cereal breeding.*—The constant demand for improved varieties of grain suitable for the varied climates of the Dominion, and especially for early ripening sorts adapted to the northern sections of the country (where settlement is now going on with increasing rapidity) is being met as far as possible by an extensive series of experiments in the cross breeding of various types of wheat (possessing those qualities which it is desirable to combine) and also of oats, barley and pease. The past season has been singularly favourable for this work, and a large number of interesting crosses have been made. In addition to this, considerable attention is being paid to the selection of the most promising strains to be found among the cross-bred varieties produced in past years at the experimental farms.

In the case of wheat, special pains are being taken to ascertain by careful study and analysis which varieties will produce flour of the best quality; so that the high reputation of Canadian wheat may be fully maintained in the future. Actual milling tests are also obtained in the case of some of the new sorts which are attracting general attention. Quality, earliness, productiveness and ability to resist rust are the characteristics looked for in the new varieties of wheat.

Somewhat similar work is also being carried on in the crossing and selection of varieties of oats, barley and pease.

*Comparative tests of varieties.*—The standard and new varieties of cereals, field roots, &c., offered to the public by seedsmen are grown in plots side by side under similar conditions, for the purpose of ascertaining their relative productiveness, earliness, &c. The new varieties produced at the experimental farms are also subjected to the same test. Interesting and important information is thus acquired each year. Over four hundred of these plots were grown during the past season.

Considerable time has been spent in this division in the establishment of a reference collection of varieties of cereals, which has already proved of great utility.

Researches have also been commenced looking to the solution of some interesting questions in regard to the variation in the proportion of husk present in different varieties of oats, barley, spelt and emmer.

## POULTRY DIVISION.

In the poultry department experimental work has been carried on calculated to be of direct service to the farmers of the country. That poultry keeping is being recognized as a paying branch of farm work is shown by increased inquiry by farmers—particularly during the past year—as to breeds of fowls most suitable to them, and their management. In order to have the best results it is necessary that farmers should keep such varieties of fowls as will be good layers of eggs in winter and produce such chickens, during the summer months, as will make the superior quality of poultry flesh, as quickly as possible, so making them remunerative all the year round. Experimental work extending over many years and published in the shape of annual reports, gives such information as is likely to bring about desirable results.

During the past year experiments have been continued with the object of ascertaining the best type of market chickens. Several new varieties have been originated and exploited with strong claims to utility standpoints as winter layers and rapid flesh makers. These are receiving careful attention, and the data being secured are likely to be of material benefit to those directly interested. It may, however, be said that so far no variety of poultry has come to the fore that will warrant any change in the recommendation made in previous years to the farmers of the country to adopt Plymouth Rocks or Wyandotte breeds as the best all the year round money makers, when properly handled.

Interesting and important results in the hatching and rearing of chickens by incubator and brooder as compared with natural mother has been ascertained, and go to show that should the farmer desire to get his chickens hatched and reared early and in number, the artificial method will afford him the best means of doing so.

Experiment has also shown that in order to have the strong, early chickens, which will make vigorous and rapid growth, it is necessary that the germs of the early eggs should be strong. The best means of securing these strong germs, from fowls which have layed well all winter, have been exercise and fresh air. Happily the majority of farmers are so situated that these requisites can, with little difficulty, be afforded their laying stock. Experimental fattening of chickens of different breeds and on different rations, in crates and with limited runs, shows useful results.

During the year addresses were delivered in different parts of the country on poultry keeping in all its different phases.

### EXPERIMENTAL FARM FOR THE MARITIME PROVINCES.

The lines of experimental work undertaken at the branch farm at Nappan, N.S., are mainly such as are likely to be of practical value to the farmers of the Maritime provinces. The tests carried on in feeding with a view to milk production, and also for the production of beef, occupy a prominent place here for the reason that these branches of agricultural industry receive the attention of a considerable number of farmers in these provinces.

The rich pastures in the valley lands in this part of the country have long been utilized for dairy purposes, and hence experiments along dairy lines are of interest to the public. The milking herd of cows kept at Nappan contains good representatives of some of the best milking breeds. Records of the quantity and quality of the milk given by these animals are kept and the relative position they occupy as factors in profitable dairying ascertained and given to the public in the annual report of the farms. Tests are also conducted in the feeding of steers to find out the influence of age on the feeding, also the fattening value of the different sorts of food used.

Additions have been made to the orchard, which now contains a considerable number of varieties of fruit trees, most of which are proving suitable to the climatic conditions found there. Many of these have borne good crops and their relative value has been tested and samples of their produce have been shown at the more important agricultural exhibitions held in these provinces.

The results obtained from the uniform test plots of grain, Indian corn, field roots and potatoes serve a useful purpose by calling attention to those varieties which are most productive and profitable.

### EXPERIMENTAL FARM FOR MANITOBA.

On the experimental farm for Manitoba, at Brandon, many different varieties of cereals have been grown to ascertain the suitability of the sorts tested to that district, as to hardiness, period of ripening, and relative productiveness. Similar experiments have also been carried on with field roots, Indian corn and potatoes, with the same objects. Tests have also been made with grasses, clovers, flax and other useful plants.

Additional experiments have been undertaken in the fattening of steers and swine, to gain information as to the relative usefulness and economy of such foods as are generally available to the farmers of Manitoba. Tests have also been conducted with some of the best breeds of poultry to find out those which are most profitable for the production of eggs and flesh. Some male animals, representing important breeds, are kept at this farm for the improvement of stock.

Good progress has been made in the raising of improved forms of the wild plum, which is found native in many localities in this province. Wherever varieties have been found of superior quality and earliness, a quantity of seed of such has been obtained and planted, from which many new seedlings have been raised. Among the new varieties thus produced, there are some which are considerably earlier in ripening than the average and are of good quality.

Some additions have been made during the year to the varieties of ornamental trees and shrubs under cultivation in the arboretum, also to the selection of bulbs and perennial plants grown in the flower borders. The results achieved at the Brandon farm have awakened a general interest in this subject in many parts of Manitoba and the influence of the work of this farm is seen in the more frequent planting of trees and shrubs about farm and town houses and in the more general cultivation of flowers for the adornment of homes. The very large number of farmers, amounting to many thousands, who annually visit this farm, carry away with them many new ideas and aspirations, which lead not only to the improvement of their methods of farming, but also to the further planting of trees and shrubs for shelter and ornament.

More than one and a half million young forest trees were grown on this farm during the year for the forestry branch of the Department of the Interior.

### EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES.

The experimental farm at Indian Head, Assa., established for the purpose of assisting the farmers in the North-west Territories, continues to do most useful work, and the experiments conducted during the past year have covered a wide field. In this part of the Dominion the raising of cereals is so important that a large proportion of the cultivated area on this farm is devoted to their growth. Owing to the unusual cool weather, and consequent backwardness of the season, the ripening of all varieties of grain was considerably delayed and some late ripening sorts failed to reach maturity before frost came, and hence were more or less injured. This condition emphasized the importance of the more general cultivation of the earlier ripening sorts, particularly of wheat. The superintendent of the farm reports that of the nine varieties of wheat grown in field lots this year, only three were fully matured and harvested before frost came. These were three of the cross-bred wheats—Preston, Stanley and Huron—which were originated at the Central Experimental Farm at Ottawa. These, although sown later than the other sorts, were cut and in stook five or six days earlier than the five other varieties grown in adjoining fields, and the three cross-bred sorts mentioned were the only ones which, on account of early ripening, escaped injury from frost and would grade No. 1 Hard. Under my instruction, samples of the Preston and Stanley were submitted, during the year, to examination by some of the best experts in the United States and Great Britain; they were also analysed by the chemist of the experimental farms. The reports received show that these wheats are of excellent quality and there seems no reason to suppose that their more general introduction in the North-west would in any way lower the quality or reputation of the wheat produced there, while their more extended growth would be a great advantage and convenience to those engaged in wheat growing.

Sixty-two varieties of wheat were sown in the uniform test plots, where they were grown under like conditions. A large number of varieties of oats, barley and pease were also tested, together with many sorts of fodder corn, field roots and potatoes. The results of these annual trial plots are published as early as possible in the season, so that farmers may have time to consider them carefully before deciding on their choice of seed for the ensuing year.

The orchards of cross-bred and seedling crab apples are making good progress and attracting much attention. The improvements made in the size and quality of these fruits, by intelligent cross-breeding, is remarkable.

The growing of young trees and shrubs for free distribution in mail packages to settlers has been continued and large numbers are sent out every year in that way. About three million of young forest trees have also been grown during the year on this farm, under my instruction, for the forestry branch of the Department of the Interior.

Experiments have been continued with Awnless Brome grass and Western Rye grass and other hay and pasture grasses, with good results. Further experiments have also been conducted in the fattening of steers.

### EXPERIMENTAL FARM FOR BRITISH COLUMBIA.

At Agassiz, where the experimental farm has been established for the benefit of the farmers of British Columbia, a large and comprehensive series of experiments has been continued. Many varieties of all the more important cereals have been tested for the purpose of finding out those which are most vigorous and productive in this climate, and samples of those which promise to be of the greatest value are distributed among the farmers for trial. In like manner, the relative merits of many different sorts of Indian corn, field roots, potatoes, grasses, clovers and other fodder crops have been tested and much information gained. Experiments have also been conducted with fertilizers on fruit trees and on farm crops and the effects of the fertilizers carefully watched and recorded.

The fruit orchards have been further extended and the collection of varieties is now very large. Many of these fruited during the past year and descriptions will be found in the report for 1903 of such varieties as have not fruited before. An extensive collection was shown at the exhibitions held in October at New Westminster and Victoria, where they were greatly admired. Fruit growing is made a specialty at this farm, and the large trial orchards are proving of much value to the fruit growers of British Columbia, as they furnish information regarding the most productive and profitable sorts to grow, also as to those which are most resistant to the diseases which injure fruits in that climate.

The stock kept at this farm consists of Shorthorn cattle, Dorset-horned sheep, improved large Yorkshire and Berkshire swine, and several breeds of poultry.

Many different kinds of vegetables are annually tested here to determine which are the most profitable to grow in that climate, and large collections of trees, shrubs and flowers have also been established. The farm is beautifully situated in a charming valley surrounded by mountains, and it is visited annually by large numbers of farmers and fruit growers and others interested in the work which is being carried on.

## GENERAL CROPS.

### RESULTS OF THE PAST SEASON.

The crops harvested in Canada during the past year have on the whole been very satisfactory, and another good year has been added to the list. The area under crop throughout the Dominion has been considerably increased and the returns with a few exceptions are well above the average.

### ONTARIO.

The crops in this province have been very bountiful. In fall wheat the yield per acre has been large, much above the average, and the quality of the grain as a rule has been excellent, plump and well ripened, weighing in some instances 62 to 64 lbs. per bushel. Taking into consideration both yield and quality, the crop of fall wheat this year has been one of the best ever had in Ontario. In spring wheat also the crop was good; much above the average of past years.

Oats have given a very heavy yield, over six bushels per acre above the average of the past eleven years. The area under this crop in 1903 was almost as great as the total acreage in hay and clover and much exceeds the area occupied by all other cereals.

The acreage occupied by barley is increasing considerably, and the crop of the past season has been unusually large, nearly eight bushels per acre above the average of the past eleven years.

The pea crop has been encouraging, better than for some years past, and the injury from the weevil has been much less than for the past year or two. Indian corn, owing to the very dry weather in May, did not germinate promptly, and the maturing of the crop was somewhat delayed. Later in the season the weather was favourable and that part of the crop which was grown for fodder was nearly an average one, while in those districts where ripened corn is harvested the yield was above the average.

Potatoes in many localities have suffered much from rot; notwithstanding this the crop has been above the average. Field roots on the whole have turned out well, and hay and clover have given about an average return.

The season of 1903 has given an unusual crop of plums and the markets were glutted with this fruit for a time, so that prices ruled low. There has been a fair crop of apples throughout this province and the quality of the fruit has been good.

### QUEBEC.

The crops in this province have also on the whole been satisfactory. In many localities, especially where the land had been recently seeded, a good crop of hay was secured, but on old meadows the yield was much lighter.

Oats in most districts have given excellent returns both of grain and straw, and the area under crop was large. Spring wheat has yielded fairly well, while barley has given unusually heavy returns. Indian corn grown for fodder has given less than the average yield owing to unfavourable weather in the spring. Potatoes have given good crops, but rot has been prevalent in many sections. Buckwheat has in many localities given excellent crops.

During the greater part of the season the pastures have been in unusually good condition, and the increase in the output of dairy products has been large. The amount of money paid this year to the farmers of Quebec for cheese and butter is estimated at about ten million dollars.

The apple crop has been a very fair one and small fruits have yielded bountifully.

## THE MARITIME PROVINCES.

In the maritime provinces the early part of the season was particularly dry and crops generally made a poor start. Subsequently the weather was favourable and the growth rapid. Oats did remarkably well and gave an excellent crop. In barley the yield was above an average one and spring wheat gave a good average return. The quality of the grain is quite satisfactory, being plump and well matured. There was very little rust this season.

Owing to the very dry weather in June, hay gave a crop below the average. Pastures also were somewhat injured by the drought, and in many places did not fully recover. Buckwheat has given crops above the average.

Field roots have given excellent returns, turnips especially have yielded heavily. Indian corn grown for fodder has given lighter crops than usual.

The apple crop has on the whole been a good one, considerably above the average, and the quality has been excellent, the fruit being very free from spot.

## MANITOBA.

While the area under wheat in Manitoba has been larger, the total crop has fallen considerably below that of 1902, and owing to unfavourable weather during harvest, the grain has graded lower than usual. The high prices, however, received by farmers for their wheat this year has done much to make up for the shortage in volume of crop, and the results of the year are regarded as fairly satisfactory. The very dry weather in June was also probably one of the causes of the shortage in the grain crop, as thus growth was checked at a critical period.

A much increased acreage is reported as broken this year, which promises well for the future.

The oat crop has been a very good one, and heavy yields are reported in many districts. Barley has given a full average return. The crop of hay is fairly good.

The output of dairy products has increased. The production of cheese in Manitoba in 1903 showed an increase of 26 per cent over that of 1902; and creamery butter an increase of 9 per cent.

## THE NORTH-WEST TERRITORIES.

The wheat crop in the North-west Territories has not averaged as high as it did last year. The weather was very dry in May and much of the grain early sown was late in germinating, and August being cold and wet, these crops so late in starting were slow in maturing, and many of them were caught by frost on the morning of September 5, before they were fully ripe. This applies particularly to fields with heavy growth on fallowed land, a large proportion of that sown on stubble ripened before frost came, and gave satisfactory returns. The high prices realized this season for wheat have been very helpful to the North-west farmers.

Oats, where sown early and on land well prepared, have given excellent returns: barley also has given satisfactory yields.

The crop of hay, owing to the dry spring, was lighter than usual, but field roots and potatoes did remarkably well. Stock throughout the Territories did well although prices have not ruled as high as last year.

## BRITISH COLUMBIA.

In the coast climate of British Columbia the weather throughout the growing season has been unusually cool and showery, nevertheless the crops have been fairly satisfactory.

Hay has given good returns and the larger part of the crop was fairly well saved.

Oats have yielded well somewhat above the average and the grain is fairly plump, barley also has given above an average crop. Spring wheat and pease have given good returns.

Indian corn grown for ensilage, gave a very fair crop, notwithstanding the unusually cool weather, and field roots of all sorts gave heavy returns. The potato crop was good and the tubers were almost free from rot.

The fruit crop has been only a medium one, but apples have been freer from scab than usual. Plums have given a fair crop, but have again suffered in the coast climate from rot.

On Vancouver Island the season has been drier and fruit has yielded well. In the interior drier districts on the main land fruit was abundant, and the crop of apples in many localities heavy and of excellent quality. Plums also yielded well and there was not much injury from rot either on Vancouver Island or in the fruit orchards in the interior.

The crop of hops both on the coast and in the interior was large and the outcome satisfactory.

## LIVE STOCK INSPECTIONS

For Year ended October 31, 1903.

### Export Inspections.

| | |
|---|---|
| Cattle | 191,697 |
| Horses | 766 |
| Sheep | 80,784 |
| Swine | 81 |

### Import Inspections.

| — | Cattle. | Horses. | Sheep. | Swine. | Goats. | Mules. |
|---|---|---|---|---|---|---|
| I.—From Europe | 259 | 309 | 243 | 124 | 93 | ........ |
| II.—From the United States | 45,038 | 46,740 | 21,731 | 1,373 | ........ | 1,203 |
| III.—From Mexico | 24,253 | 1,204 | ........ | ........ | ........ | 31 |
| IV.—From Newfoundland | ........ | 1 | ........ | ........ | ........ | ........ |
| Total | 69,550 | 48,254 | 21,974 | 1,497 | 93 | 1,234 |

## ARCHIVES.

The following is a list of the books received during the past year:—

*From London—*

Nova Scotia General Correspondence to 1742.
Nova Scotia Journals to 1800.
Nova Scotia Acting Governors, 1743 to 1749.
Despatches to Governors Upper Canada to 1840.
Prince Edward Island Minutes of Executive Council to 1801.

*From Paris—*

Collection de Moreau de St. Mery to 1696.
Correspondance Générale.
Mémoire sur le Canada 1706-1710.
Lettres de la Cour et réponses 1710.
Instructions du Roi aux gouverneurs 1704-1708.
Pontchartrain aux Randot 1703-1708.
Réponses des Randot 1705-1708.
Etat Civil Canada 1715-1756.
Etat Civil Louisbourg 1728-1758.
Etat Civil Repertoire.

## III.—PATENTS OF INVENTION.

The following comparative tables show the transactions of the Patent Branch of the Department of Agriculture, from the calendar year 1893, to the year ended October 31, 1903:—

| Years. | Applications for Patents. | Patents and Certificates Granted. | | | Caveats. | Assignments of Patents. |
|---|---|---|---|---|---|---|
| | | Patents. | Certificates. | Total. | | |
| *1893 | 2,614 | 3,153 | 292 | 3,445 | 229 | 1,345 |
| 1894 | 3,291 | 2,756 | 462 | 3,218 | 301 | 1,445 |
| 1895 | 3,387 | 3,074 | 422 | 3,496 | 343 | 1,550 |
| 1896 | 3,728 | 3,488 | 413 | 3,901 | 306 | 1,420 |
| 1897 | 4,300 | 4,013 | 284 | 4,297 | 377 | 1,551 |
| 1898 | 4,200 | 3,611 | 262 | 3,873 | 363 | 1,657 |
| 1899 | 4,305 | 3,151 | 412 | 3,563 | 311 | 1,467 |
| 1900 | 4,628 | 4,522 | 482 | 5,004 | 283 | 1,914 |
| 1901 | 4,817 | 4,766 | 551 | 5,317 | 302 | 2,323 |
| 1902 | 5,301 | 4,391 | 510 | 4,901 | 317 | 2,339 |
| 1903 | 5,912 | 5,673 | 432 | 6,105 | 328 | 2,384 |

* For 10 months only.

### DETAILED STATEMENT, Patent Office Fees.

| Years. | Patents. | Assignments. | Caveats. | Copies. | Subscription to 'Patent Record.' | Notices to Apply for Patent. | Sundries. | Total. |
|---|---|---|---|---|---|---|---|---|
| | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| *1893 | 58,441 81 | 2,633 71 | 1,244 70 | 796 15 | 285 18 | 337 81 | 110 73 | 63,850 19 |
| 1894 | 73,061 77 | 3,142 74 | 1,793 40 | 764 07 | 347 21 | 1,449 80 | 123 57 | 80,682 56 |
| 1895 | 78,223 52 | 3,194 00 | 1,854 35 | 761 54 | 245 98 | 1,951 30 | 129 79 | 86,358 48 |
| 1896 | 85,060 61 | 3,130 56 | 1,790 65 | 898 27 | 420 60 | 2,245 79 | 57 04 | 93,532 52 |
| 1897 | 93,298 16 | 3,250 23 | 2,108 57 | 969 33 | 252 53 | 2,110 89 | 128 21 | 102,117 92 |
| 1898 | 91,176 44 | 3,641 90 | 1,935 74 | 706 50 | 266 44 | 1,463 10 | 172 73 | 99,361 95 |
| 1899 | 98,669 92 | 3,781 71 | 1,533 25 | 1,028 80 | 198 05 | 1,912 00 | 137 83 | 107,261 56 |
| 1900 | 104,848 96 | 4,255 40 | 1,405 00 | 932 54 | 552 71 | 1,742 70 | 115 15 | 113,852 46 |
| 1901 | 109,985 59 | 4,506 07 | 1,479 25 | 882 87 | 592 47 | 2,484 90 | 133 22 | 120,064 37 |
| 1902 | 119,766 43 | 5,079 20 | 1,565 35 | 1,112 59 | 327 95 | 1,883 00 | 162 30 | 129,896 82 |
| 1903 | 130,561 00 | 5,309 00 | 1,863 00 | 1,067 82 | 373 75 | 1,994 25 | 254 99 | 141,363 81 |

* For 10 months only.

The Patent Office fees received during the year ended October 31, show a surplus of $82,422.63 over the working expenses of the office as per subjoined table.

| Receipts. | $ cts. | Expenditure. | $ cts. |
|---|---|---|---|
| Cash received | 141,363 81 | Salaries | 39,235 00 |
| Cash refunded | 2,325 94 | 'Patent Record' | 17,380 24 |
| | | | 56,615 24 |
| | | Receipts over expenditure | 82,422 63 |
| Net cash | 139,037 87 | | 139,037 87 |

The following is a table of the countries of residence of the patentees for the years named:—

| Countries. | 1893. | 1894. | 1895. | 1896. | 1897. | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Canada | 685 | 661 | 707 | 740 | 756 | 710 | 601 | 707 | 744 | 654 | 794 |
| England | 206 | 177 | 179 | 215 | 266 | 261 | 205 | 254 | 256 | 239 | 248 |
| United States | 2,061 | 1,731 | 1,980 | 2,270 | 2,666 | 2,312 | 2,038 | 3,216 | 3,423 | 3,164 | 4,222 |
| France | 24 | 24 | 21 | 24 | 26 | 39 | 36 | 40 | 50 | 45 | 57 |
| Germany | 88 | 108 | 102 | 117 | 126 | 124 | 112 | 157 | 125 | 100 | 116 |
| Other countries | 89 | 55 | 85 | 122 | 173 | 165 | 159 | 148 | 168 | 189 | 236 |
| Total | *3,153 | 2,756 | 3,074 | 3,488 | 4,013 | 3,611 | 3,151 | 4,522 | 4,766 | 4,391 | 5,673 |

*For 10 months only.

The Canadian patentees were distributed among the provinces of the Dominion as follows:—

| Provinces. | 1893. | 1894. | 1895. | 1896. | 1897. | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ontario | 437 | 404 | 451 | 430 | 464 | 383 | 310 | 396 | 407 | 373 | 438 |
| Quebec | 151 | 162 | 177 | 201 | 178 | 171 | 160 | 164 | 185 | 148 | 194 |
| New Brunswick | 23 | 13 | 13 | 12 | 20 | 26 | 7 | 14 | 26 | 14 | 18 |
| Nova Scotia | 29 | 15 | 19 | 32 | 22 | 27 | 18 | 21 | 17 | 26 | 22 |
| Pince Edward Island | 3 | 2 | 6 | 2 | 2 | 4 | 8 | 1 | 0 | 1 | 2 |
| Manitoba and the North-west Territories | 26 | 38 | 18 | 28 | 36 | 45 | 50 | 42 | 52 | 40 | 64 |
| British Columbia | 16 | 27 | 23 | 35 | 34 | 54 | 48 | 69 | 57 | 52 | 56 |
| Total | *685 | 661 | 707 | 740 | 756 | 710 | 601 | 707 | 744 | 654 | 794 |

*For 10 months only.

Patents issued to residents of Canada, with the ratio of population to each patent granted:—

| Provinces. | Patents. | One to every |
|---|---|---|
| British Columbia | 56 | 8,190 |
| Ontario | 438 | 4,960 |
| Manitoba and North-west Territories | 64 | 7,290 |
| Quebec | 194 | 8,483 |
| New Brunswick | 18 | 18,397 |
| Nova Scotia | 22 | 20,885 |
| Prince Edward Island | 2 | 51,629 |
| Total | 794 | |

Statement of the number of patents issued under the Act of the session of 1892, 55-56 Vic., chap. 24, on which the fees are paid for periods of six, twelve or eighteen years, at the option of the patentee; and of patents on which certificates of payments of fees were attached after the issue of patents originally granted for periods of five and ten years.

| Years. | Periods for which the Fees were paid on first issue. | | | Patents on which Certificates were attached after issue. | | | |
|---|---|---|---|---|---|---|---|
| | 6 years. | 12 years. | 18 years. | 6 years. | 12 years. | 5 years. | 10 years. |
| 1893 (ten months ended October 31) | 3,098 | 9 | 46 | ...... | 3 | 279 | 10 |
| 1894 (twelve months ended October 31) | 2,701 | 9 | 46 | ...... | 4 | 433 | 25 |
| 1895 " " | 3,049 | 5 | 20 | ...... | ...... | 416 | 6 |
| 1896 " " | 3,443 | 11 | 34 | 2 | ...... | 401 | 10 |
| 1897 " " | 3,981 | 8 | 24 | 15 | 3 | 262 | 4 |
| 1898 " " | 3,586 | 3 | 22 | 176 | 9 | 77 | ...... |
| 1899 " " | 3,125 | 3 | 23 | 291 | 13 | 108 | ...... |
| 1900 " " | 4,489 | 4 | 29 | 366 | 21 | 101 | ...... |
| 1901 " " | 4,719 | 8 | 39 | 408 | 31 | 112 | ...... |
| 1902 " " | 4,362 | 2 | 27 | 412 | 39 | 59 | ...... |
| 1903 " " | 5,630 | 2 | 41 | 405 | 27 | ...... | ...... |

The preceding tables show that there has been a large increase in the transactions of the Patent Office during the past year. The total revenue for the year ended October 31, 1902, was $141,363.81, exceeding all previous years; resulting in an increase of $11,466.99 over the preceding year, and a surplus of $82,422.63 over the expenditure.

The total number of reports issued by the examiners during the year was 7,982.

Out of the total number of patents granted during the year, there were 4,222 issued to inventors resident in the United States, being over 74 per centum of the whole issue.

Patentees who are resident in foreign countries, continue to avail themselves of the privilege granted under section 8 of 'The Patent Act,' by giving notice of intention to apply for patents in Canada. The number of these notices registered during the year was 974, yielding a revenue of $1,994.25.

The 'Canadian Patent Office Record' continues to be published monthly. It contains a transcript, with drawings, of all claims of patents granted, dates of filing, dates of issue, and length of term for which fees have been paid; also names and residences of patentees, as well as containing a list of registered copyrights, trade marks and designs. This publication is of great and increasing value to all who are interested in patents, trade marks, copyrights and designs. It affords convenient and easy reference to the claims of all patents granted in Canada, and thus enables both inventors and the public to see exactly what is patented.

This publication is supplied to foreign patent offices, and is also sent without charge to a large number of free libraries in Canada, and in foreign countries, with the object of diffusing in the public interest the information therein contained. The publication is also furnished to the public at $2 per annum, or 20 cents for single monthly numbers.

This branch of my department is indebted to the British and United States Patent Offices, for their weekly official reports.

The classification of Canadian patents from June 8, 1824 (the first Canada patent) to October 31, 1903, has been completed and is now in the hands of the examiners, and is being continued as the patents are issued.

It may be remarked that this classification of patents has been a very onerous undertaking, embracing, as it does, all Canadian patents from the beginning of the patent office down to the present period; but the time and expense involved in the preparation of this compilation will be amply repaid in its usefulness to the examiners in the discharge of their duties, insuring a more reliable examination and a great saving of time in making the necessary researches.

I have again to direct the attention of patentees and their solicitors, to the necessity of remitting partial fees before the expiry of the six and twelve years' terms, otherwise the patents will cease and determine, the Commissioner not being vested with the discretionary power, under any circumstances, to revive them. A revival can only be secured by a private Act of Parliament, the obtaining of which entails considerable expense to the patentee. It may further be added that the Committee on Private Bills usually discourages applications of this kind, on the ground that no one should be denied the right of manufacturing, using or vending an invention which has become the property of the public. Exceptional cases may arise, however, in which the patentee or the holder of the patent may be justly entitled to relief from parliament.

It is in the interest of both the applicants and the office that great care should be taken by applicants and their attorneys in the preparation of the papers and drawings which are required by the rules and forms.

The Act to amend 'The Patent Act' passed during the last session came into force on the thirteenth of August, 1903.

In view of the judgment of the Supreme Court of Canada in the matter of Power versus Griffin, delivered the fifteenth day of December, 1902, the amending Act affords remedial measures in respect to patents under which manufacture was not commenced within the prescribed time mentioned in the repealed section 37 of 'The Patent Act,' and in cases where second or subsequent extensions of time to manufacture were granted. Provision is also made under section 9 for the legalization of all extensions of time for manufacturing and importing, hitherto signed by the Deputy Commissioner or Acting Deputy Commissioner, and section 1 provides that the Deputy Commissioner, or the Acting Deputy Commissioner, in his absence, may perform any act or thing, whether judicial or ministerial, which the Commissioner is authorized or empowered to do by any provision of 'The Patent Act.'

The amending Act makes the existence of a Canadian patent entirely independent of the life of the corresponding patent elsewhere, and applies to existing patents as well as to those granted hereafter.

The Commissioner is given the power under section 7 to order that certain patents, having due regard to the nature of the invention, be placed under the conditions of the license system instead of being subject to the manufacturing conditions set forth in section 4 of the amending Act.

Since the Act came into force a very large number of applications have been received from patentees to have their patents made subject to these conditions. In dealing with these applications the requirement of the law in regard to manufacture has been kept in mind. The applications which have been granted are those relating to patents for inventions such as the following: An art or process; improvements on a patented invention when both patents are not held by the same person; appliances or apparatus used in connection with railways, telegraph, telephone and lighting systems, and other works usually under the control of public or large private corporations, and which appliances or apparatus cannot be installed or constructed without the consent of such corporations; and certain inventions which are manufactured or constructed only to order, and are not, according to custom, carried in stock.

In consequence of an opinion given by the Department of Justice on the ninth day of April, 1903, to the effect that the Patent Office had, up to that time, given too liberal an interpretation to the law in dealing with applications for extensions of time to manufacture and import, the practice of the office in that regard has been changed, and since that date the law has been applied according to its strict and literal meaning. and the applications have been granted only when the applicant has clearly established to the satisfaction of the office, by affidavit or solemn declaration, that the failure to manufacture or import is due to no fault of his, but to reasons beyond his control. Although these applications continue to be quite numerous, it is seldom that such a case is made out as warrants the granting of the application.

The regular work of this branch of my department during the year has been attended to with as much dispatch as possible, and I am pleased to say that the number of applications unavoidably in arrears in the examiners' divisions has been greatly reduced.

## IV.—COPYRIGHTS, TRADE MARKS, INDUSTRIAL DESIGNS AND TIMBER MARKS.

STATEMENT of fees received by the Copyright and Trade Marks Branch from November 1, 1902, to October 31, 1903.

| Months. | Trade Marks. | Copyrights. | Designs. | Timber Marks. | Assignments. | Copies. | Total. |
|---|---|---|---|---|---|---|---|
| 1902. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| November | 1,383 75 | 101 00 | 50 00 | 6 00 | 7 00 | 26 25 | 1,574 00 |
| December | 1,289 85 | 131 50 | 35 00 | 4 00 | 31 25 | 12 00 | 1,503 60 |
| 1903. | | | | | | | |
| January | 1,016 65 | 88 75 | 48 00 | 8 00 | 15 00 | 5 00 | 1,181 40 |
| February | 1,630 90 | 97 00 | 70 00 | 4 00 | 19 00 | 10 25 | 1,831 15 |
| March | 1,455 25 | 69 50 | 73 50 | 4 00 | 39 00 | 16 00 | 1,657 25 |
| April | 1,160 25 | 113 00 | 65 00 | 2 00 | 18 00 | 14 50 | 1,372 75 |
| May | 1,551 00 | 93 00 | 38 50 | 2 00 | 168 00 | 16 50 | 1,869 00 |
| June | 1,116 10 | 145 50 | 6 00 | 2 00 | 35 00 | 4 10 | 1,308 70 |
| July | 1,095 25 | 75 00 | 30 00 | 4 00 | 27 25 | 7 00 | 1,238 50 |
| August | 1,275 00 | 117 00 | 35 00 | 4 00 | 67 00 | 3 00 | 1,501 00 |
| September | 1,425 90 | 74 00 | 61 00 | 4 00 | 24 00 | 11 50 | 1,600 40 |
| October | 1,316 00 | 80 50 | 17 50 | 6 50 | 8 00 | 20 00 | 1,448 50 |
| | 15,715 90 | 1,185 75 | 529 50 | 50 50 | 458 50 | 146 10 | 18,086 25 |

The following table shows a comparative statement of the business of this branch from 1893 to October 31, 1903, inclusive :—

| Year. | Letters Received. | Letters Sent. | Copyrights Registered. | Certificates of Copyrights. | Trade Marks Registered. | Certificates of Trade Marks. | Industrial Designs Registered | Certificates of Industrial Designs. | Timber Marks Registered. | Certificate of Timber Marks. | Assignments Registered. | Fees Received. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | $ cts. |
| 1893 ....... | 1,432 | 2,070 | 475 | 126 | 257 | 257 | 41 | 41 | 19 | 19 | 55 | 8,013 33 |
| 1894..... .. | 1,882 | 2,720 | 546 | 216 | 311 | 311 | 39 | 39 | 20 | 20 | 77 | 9,463 63 |
| 1895.... ... | 2,184 | 3,279 | 601 | 163 | 374 | 374 | 52 | 52 | 20 | 20 | 70 | 11,673 26 |
| 1896 ....... | 2,185 | 3,437 | 653 | 212 | 331 | 331 | 68 | 68 | 14 | 14 | 161 | 10,579 54 |
| 1897 ....... | 2,606 | 3,548 | 756 | 273 | 446 | 446 | 75 | 75 | 13 | 13 | 94 | 14,101 93 |
| 1898.. .. | 2,576 | 3,453 | 734 | 275 | 423 | 423 | 136 | 136 | 15 | 15 | 114 | 13,535 17 |
| 1899...... .. | 2,487 | 2,910 | 702 | 237 | 430 | 430 | 112 | 112 | 5 | 5 | 117 | 14,161 28 |
| 1900...... | 2,679 | 3,213 | 893 | 247 | 447 | 447 | 126 | 126 | 22 | 22 | 136 | 14,782 53 |
| 1901.. .... | 2,605 | 3,211 | 888 | 249 | 521 | 521 | 146 | 146 | 24 | 24 | 183 | 16,823 26 |
| 1902.... ... | 2,687 | 3,257 | 900 | 196 | 528 | 528 | 164 | 164 | 26 | 26 | 222 | 17,703 09 |
| 1903....... | 2,687 | 3,211 | 900 | 176 | 557 | 557 | 88 | 88 | 23 | 23 | 272 | 18,086 25 |

The total number of registrations of copyrights, trade marks, industrial designs and timber marks, including registrations of assignments, was 1899, during the year ended October 31, 1903. This consisted of 900 registrations of copyrights, 557 registrations of trade marks, 88 of industrial designs and 23 of timber marks. There were also issued 170 certificates of copyrights, 49 registrations of interim copyrights, and 6 certificates, 6 registrations of temporary copyrights, and 3 certificates. The total number of assignments of these different rights recorded was 272.

The correspondence of this branch of the department amounted to 2,687 letters received; 3,211 letters sent.

The amount of fees received during the year, as certified by the accountant, amounted to $18,086.25.

## V.—PUBLIC HEALTH AND QUARANTINE.

The threatenings of the bubonic plague, cholera and small-pox mentioned in my last annual report have continued throughout this year.

The continuation of strict precautionary measures, ordinary and special, for the sanitary protection of the country has therefore been necessary.

The increasing public demand for governmental recognition of the importance of hygiene and preventive medicine is instanced by the fact that I am, again, in receipt of a copy of a resolution, adopted by the Canadian Medical Association at its annual meeting at London, in August last, again pressing upon the consideration of the government the expediency of creating a department of public health, under one of the existing ministers.

In consequence of the marked threatening of infectious disease on both our coasts and on our frontier, circulars of warning and instruction have been issued from time to time to the transportation companies and to the quarantine and customs officers.

The exemption from routine inspection of vessels arriving from New York and ports north thereof—usual in healthy years—was not permitted during the greater part of the year, owing to the continued presence of small-pox in the New England and neighbouring states. Upon the diminution of the epidemic, however, during last summer the exception from routine inspection was again extended to these vessels from and after August 15.

So on the Pacific side inspection of all vessels from San Francisco has been maintained throughout the year on account of the continued presence of the bubonic plague in that city.

Frontier and extra coast inspections for small-pox on threatened parts of the international border and of the sea-board have been maintained more or less throughout this year, as the conditions to the south of us seemed to me to require.

Such extra inspections I instituted or continued at the following places: in Nova Scotia. Louisbourg, Canso and Yarmouth; in New Brunswick, McAdam Junction: in Ontario, Owen Sound, Thessalon, Bruce Mines, Sault Ste. Marie, Rainy River, Port Arthur, and Fort William; in Manitoba, Sprague, Emerson, Gretna, Morden, and Crystal City; in the North-west Territories, North Portal, Coutts and Macleod; and in British Columbia, Northport (for Rossland and Nelson), Grand Forks, Greenwood, Huntingdon, and Blaine.

In addition to the officers holding these posts Dr. James Patterson, of Winnipeg, has continued to act for me in the management and suppression of small-pox in the North-west Territories.

The bubonic plague has claimed victims from time to time during this year in San Francisco. There have been five fatal cases reported this month. The total cases of this disease in that city from the beginning of the outbreak up to this date have been one hundred and seven, and the deaths one hundred and two.

This disease has occurred during the year in South Africa, Australia, Bolivia, Brazil. Chili, China, Egypt, Formosa, France, Germany. Hawaiian Islands, India. Japan, Mauritius, Mexico, New Caledonia, Peru, Philippines, Turkey. Straits Settlements, and in San Francisco.

It did not make a footing on our shores, but cases of plague occurred on three of the vessels which trade between the Orient and British Columbia.

The disinfection of these and similar vessels coming from the Orient at the ports of departure lessens the routine disinfecting work at my British Columbia maritime quarantine station, whilst it also lessens the threatening of the arrival of infected vessels, persons and things.

The facts connected with the conveyance and communication of plague by rats and the fleas that infest them have continued to be the subject of scientific investigation, and experiments are being made in other countries to determine the best method of destroying rats in vessels without the necessity of removing the cargo, and yet without danger of injuring it.

Cholera has prevailed during the year in Brazil, China, Dutch India (Java and Batavia), Egypt, India. Japan, the Philippine Islands, the Straits Settlements, Syria and Turkey.

Yellow fever: The observations and literature of the year in connection with this disease confirm the belief in part played in its dissemination by the mosquito, the *Stegomyia fasciata,* acting as an intermediate host for the yellow fever parasite.

In Havana this disease has been endemic and epidemic for many years. As a result of the scientific crusade against the *Stegomyia fasciata* and the screening of patients there has not been a single case of local origin in Havana for two years Nine cases were brought into the city during last summer, but, having been so proaected that no mosquitoes could gain access to them, they were unable to convey the infection to others, and so no subsequent cases developed from any of the nine.

Small-pox has prevailed world-wide during the year. It has continued to threaten us on both the Atlantic and Pacific coasts and along our international frontier.

The diseases which have been brought to my maritime quarantine stations during the year are small-pox, enteric fever. scarlet fever, diptheria. measles. chicken-pox and beri-beri.

In not a single instance during the year did any one of these diseases gain an entrance through any of my organized maritime quarantine stations. My frontier inspections were also very efficient in keeping out actual cases of disease and in promoting vaccination.

In these ways great good has been done in protecting the public health of the country with the minimum interference with travel and traffic.

Details of this year's work at my different stations, at the Tracadie Leper Lazaretto, and under the Public Works Health Act. will be found in the reports of my officers annexed hereto.

## VI.—STATISTICS.

The Statistical Division of the Department of Agriculture is based upon the Union Act of 1867, which specifically assigns Census and Statistics to the exclusive authority of the Parliament of Canada.

In accordance with this assignment of duties the Dominion Parliament passed Chap. 21 Acts of 42 Victoria.

In the Revised Statutes of Canada, 1886, this Act forms Chaps. 58 and 59. Chap. 60 is the authority for the collection of Criminal Statistics.

Chapter 59 Revised Statutes of Canada provides (1st section) for the collecting, abstracting, tabulating and publishing of vital, agricultural, commercial, criminal and other statistics by the Department of Agriculture.

The fourth section gives the Minister of Agriculture power to arrange with any Lieut.-Governor in Council, or with any provincial organization for the collection and transmission of information collected under provincial systems.

The fifth section says:—

'The Minister of Agriculture may, in collecting statistics in the manner provided by this Act, call upon any and all public officers to furnish copies of papers and documents and such information as lie respectively in the power of such officers to furnish, with or without compensation for so doing, as is regulated, from time to time, by the Governor in Council.'

The sixth section provides for the publication of an abstract and record of the various departmental or other public reports and documents.

The seventh section gives power to the Governor in Council to authorize the Minister of Agriculture to cause special statistical investigations as regards subjects, localities or otherwise to be made.

The eighth section empowers the Minister of Agriculture to cause all statistical information obtained to be examined, and any omissions, defects, or inaccuracies discernible therein to be supplemented and corrected as far as possible.

The ninth section is as follows:—

'Everyone who wilfully gives false information or practices any deception in furnishing information provided for by this Act shall, on summary conviction before two justices of the peace, be liable to a penalty not exceeding one hundred dollars.'

By another section of the Act, the Governor in Council is empowered to appoint temporary clerks or employees for an indefinite period.

The evident aim and intention of these several Acts is the establishment of a Bureau of Statistics, which shall form part of the Department of Agriculture, and in which shall be consolidated the general statistics of the country, the officers in charge of which shall have every facility necessary to enable them to obtain the needed statistics from the several departments of the federal government, and of the provincial governments, or by special statistical investigations.

A general collection and issue of Dominion government statistics by the statistical division, as directed by the statute, would establish uniformity, coupled with increased accuracy and large economy in compilation.

The statistical division has collected during the year, material to enable it to provide a system for collecting agricultural statistics throughout the Dominion supplementary to the systems employed in some, but not all of the provinces. If a good plan insuring accuracy and early publication could be adopted in Canada, the value to farmers and business men of this information can hardly be over-estimated. The crop reports of the United States, going over all Europe monthly, are a good advertisement of the agricultural possibilities of the country, while an early knowledge of the actualities gives to growers and dealers an advantage, in connection with output and prices, which is of direct pecuniary value.

The frequency with which applications are made to the statistician for information about the crops of Canada, coming as these applications do both from within the Dominion and from outside countries, suggests the advisability of establishing in the near future a statistical inquiry dealing with crops, prices, cost of transportation and like matter.

A great increase in the number of applications for statistics is one feature of the year's experience.

The greater interest taken in Canada is seen in this increased demand.

Annual publications of many countries call for statistics of Canada to a much larger extent than in former years. The number of the list is so great as to make large demands on the time of the officers of this division.

## HEALTH STATISTICS.

No steps have been taken as yet to provide a better system of collecting vital statistics than that which was abolished in 1891.

In the provinces of Ontario, Quebec, New Brunswick, British Columbia, Manitoba and the North-west Territories, the provincial and territorial authorities have placed on the statute-books Acts dealing with the collection of vital statistics. Section 4 of chap. 59, Revised Statutes of Canada, already quoted, gives the necessary legislative authority to enable my department to join the provincial authorities in making arrangements for the better collection of different kinds of statistics, without limiting the power of my department to enter upon provincial fields not worked by provincial organizations. By a combination of forces the result would be more satisfactory than by any other system that could be originated by the federal authorities. Instead of clashing statistics there would be statistics having a joint approval.

## CRIMINAL STATISTICS.

The special analysis of these statistics which has accompanied in former years the general report of the department will be found, this year, as last, in the preliminary pages of the special blue book prepared by the statistical branch.

A few salient points may be given.

The number of convictions for all kinds of crimes and misdeameanours in Canada for the year 1902 was 43,536, which represents one convicted law-breaker in every group of 125 persons. This is the highest criminality recorded for the Dominion.

During the period 1891-1902, the average is equal to one in every 133. The years of lowest criminality were 1892 and 1893, when there was punished one law-breaker in every group of 138 persons.

Taking the provinces of the Dominion, the largest group to each convicted person in 1902 was found in Prince Edward Island.

According to provinces the record is as follows:—

| | | | 1902. |
|---|---|---|---|
| Prince Edward Island.....1 | convicted person | in each group of | 285 |
| New Brunswick...........1 | " | " | 139 |
| Nova Scotia...... .......1 | " | " | 120 |
| Quebec...................1 | " | " | 178 |
| Ontario...... .... .......1 | " | " | 112 |
| Manitoba.................1 | " | " | 119 |
| N. W. Territories.........1 | " | " | 74 |
| British Columbia..........1 | " | " | 54 |

At one end of the Dominion stands Prince Edward Island with the largest group of persons from which one was drawn during the year, and branded as a criminal. At the other end is British Columbia with one criminal in every 54 of her inhabitants.

The above table includes all kinds of misdemeanours, the serious offences and such others as breaches of municipal laws, vagrancy, drunkenness and the like.

Indictable offences include only murder and manslaughter and other offences against the person, robbery with violence, burglary, horse and cattle stealing and other offences against property.

Of these there were 5,660 convictions in 1902.

Taking the provinces and the years 1891 and 1901, to institute a comparison, the record is:—

| | | | 1891. | 1901. |
|---|---|---|---|---|
| P.E. Island...... ...1 | convicted | in each group of | 3,760 | 6,070 |
| New Brunswick......1 | " | " | 3,350 | 2,610 |
| Nova Scotia.........1 | " | " | 3,632 | 1,400 |
| Quebec..............1 | " | " | 1,100 | 1,110 |
| Ontario.............1 | " | " | 1,034 | 790 |
| Manitoba............1 | " | " | 1,660 | 1,280 |
| N. W. Territories....1 | " | " | 1,345 | 874 |
| British Columbia.....1 | " | " | 700 | 400 |

Reduced to a per cent basis the size of the respective provincial groups containing one criminal convicted of serious crime has been changed in the decade 1891-1901, as the following table shows:—

Decrease or increase in size of group containing one criminal 1901 compared with 1891.

| | | | |
|---|---|---|---|
| British Columbia | group | decreased.. .. .. .. .. .. | 43 per cent. |
| Ontario | " | " .. .. .. .. .. .. .. | 25·5 " |
| Quebec | " | increased.. .. .. .. .. .. | 0·9 " |
| Manitoba .. | " | decreased.. .. .. .. .. .. | 28·0 " |
| N. W. Territories | " | " .. .. .. .. .. .. .. | 35·0 " |
| New Brunswick | " | " .. .. .. .. .. .. .. | 22·0 " |
| Nova Scotia | " | " .. .. .. .. .. .. .. | 61·0 " |
| P. E. Island | " | increased.. .. .. .. .. .. | 61·5 " |

If a group of 3,632 persons contained one criminal in 1891, as in the case of Nova Scotia, and crime had so increased that each group of 1,400 persons had in 1901 a criminal, then the group had shrunk by 61 per cent from its earlier dimensions, thus representing a large increase in crime.

It will be seen that all the provinces have in varying proportions increased their quota of serious crime, excepting Prince Edward Island, in which the group of 1901 is 61½ per cent larger than that of 1891, showing that crime has greatly decreased in the decade. In the province of Quebec serious crime has practically neither increased nor decreased. A slight decrease is apparent, the group of 1891 being 1,100 and that of 1901 being 1,110.

Taking one class of charges from the summary convictions—drunkenness—it is noted that the number of convictions for the offence in 1902 was 13,324. During the 12 years 1891-1902, the yearly average number of convictions was 11,815, showing an increase in 1902, over the average, of 13 per cent. In 1902 in every group of 408 persons one was convicted of drunkenness. The year of least convictions was 1897, when the number was 10,586, and the group figures one in each 484 of the population.

*By Provinces.*

| | | | | |
|---|---|---|---|---|
| Ontario had | 3,944, | or 1 | in each group of | 555 |
| Quebec had | 2,783 | “ 1 | “ | 598 |
| Nova Scotia had | 2,012 | “ 1 | “ | 229 |
| New Brunswick had | 1,403 | “ 1 | “ | 236 |
| Manitoba had | 1,003 | “ 1 | “ | 269 |
| The Territories had | 757 | “ 1 | “ | 229 |
| British Columbia had | 1,192 | “ 1 | “ | 159 |
| P.E. Island had | 230 | “ 1 | “ | 446 |

Quebec, according to this list, is the freest from drunkenness of all the provinces. Ontario is a close second and Prince Edward Island third—some distance off, however. All the other provinces and the Territories fall far behind, the average of the five being 224 against an average of 576 for Ontario and Quebec.

British Columbia is the province with the largest number of convictions for drunkenness in proportion to population.

While it is not safe to draw any conclusion as to the prevalence of drunkenness from these data, for it may be that the laws are more stringent and the administration of the laws stricter in one province than in another, yet in a general way the indications are that 1st. drunkenness is on the increase in Canada, and 2nd. that a retrograde movement is observable even in such an advanced province as Ontario, the convictions having been more numerous in 1902 than in any previous year as far back as 1892.

The only province which shows a steady diminution in the convictions for drunkenness is Quebec, which in

| | | | | | |
|---|---|---|---|---|---|
| 1894 | had one conviction | for each | group of | 359 | persons. |
| 1895 | “ | “ | “ | 360 | “ |
| 1896 | “ | “ | “ | 366 | “ |
| 1897 | “ | “ | “ | 409 | “ |
| 1898 | “ | “ | “ | 429 | “ |
| 1899 | “ | “ | “ | 434 | “ |
| 1900 | “ | “ | “ | 509 | “ |
| 1901 | “ | “ | “ | 555 | “ |
| 1902 | “ | “ | “ | 598 | “ |

It is not to be supposed that the hand of the law has relaxed its hold on this vice. Nor is it possible that the collection of convictions is not as carefully made in late years as in the earlier ones. As a matter of fact the returns from which the compilations are made number six more in 1902 than they did in 1892, showing that a wider area is included in the returns of 1902.

It is satisfactory to find from the returns that in respect to crime in general—indictable crimes and drunkenness—Manitoba and the Territories possess a good record.

Notwithstanding the influx of outsiders, crime, as gauged by the number of convictions, has not greatly increased.

In 1902 the convictions for all kinds of crime in Manitoba were one in each group of 119 persons.

In 1902 from each group of 119 persons the courts took one person, tried him and convicted him of drunkenness.

In 1901 the group numbered 115. In 1895 it numbered 155, and in 1898, 162. There has been an increase in convictions, indicating an increase in crime. There has also been a recovery.

In the Territories there is declension from the primitive times when the group that supplied one criminal numbered 120, 106 and 103, as compared with the record of recent years, the 1898 group being 59, the 1899 group 47, and the 1900, 44 persons—the early years of the decade were paradisaic in their freedom from crime. The more recent years indicate that crime is being checked, the record being for 1901, one convicted person for each group of 58 of the population, and for 1902, one for each group of 74.

In indictable offences the record of the Territories and Manitoba is:

| Year. | Territories. | Yukon. | Population. | Manitoba. | Population. |
|---|---|---|---|---|---|
| 1902 | 272 | 48 | 233,333 | 223 | 273,514 |
| 1901 | 207 | 40 | 215,914 | 202 | 258,567 |
| 1900 | 170 | 95 | 199,843 | 269 | 244,667 |
| 1899 | 256 | ........ | 185,019 | 224 | 231,519 |
| 1898 | 190 | ........ | 171,342 | 200 | 219,079 |
| 1897 | 170 | ........ | 158,719 | 245 | 207,308 |
| 1896 | 144 | ........ | 147,067 | 181 | 196,171 |
| 1895 | 156 | ........ | 136,310 | 160 | 186,687 |
| 1894 | 171 | ........ | 126,375 | 186 | 178,020 |
| 1893 | 135 | ........ | 117,199 | 168 | 169,756 |
| 1892 | 95 | ........ | 108,721 | 82 | 161,876 |
| 1891 | 75 | ........ | 100,886 | 93 | 154,362 |

Manitoba in 1891 had one individual convicted of serious offence in every group of 1,660 of her inhabitants, and with two or three exceptional years the record ever since is above the thousand in the group, 1902 giving one criminal in each group of 1,226.

The Territories did not begin with so good a record as Manitoba's, nor have they maintained their record as well. In 1891 there was one convicted criminal in each group of 1,345 of the inhabitants. The proportion rose in 1893 to one in 870, and in 1899 rose still higher to one in 723. In 1902 it was one in 730. For drunkenness there was one person convicted in each group of 601 of the inhabitants in 1891 and in 1902 one in each group of 229.

There were 359 persons making returns of criminal statistics under the statute in 1902. Of these 34 made returns showing that no charges of crime or law breaking had been tried during the year.

During the two years 1891 and 1892 the returns sent in averaged 284; so that there has been an increase of 75 in the number of persons making returns. Comparing the same two year periods the number of returns in 1891-2 which contained no record of trials, none having been held, was 27. In 1901-02 the number was 40. In the first period the percentage of 'clean sheets' to the total number of returns was 9·5, and in the second 11·5, indicating a larger area without crime in 1901-02, and as the number of convictions is greater, being one in 126 in 1901-02, against one in 132 in 1891-2, also indicating a concentration of crime due no doubt to the rapid growth of urban population.

### THE STATISTICAL YEAR BOOK.

This work is published by my department under authority of chap. 59, sec. 6, Revised Statutes of Canada.

The demand for the book is greater each year. To meet this increasing demand, I enlarged the issue for last year by 1,500 English and 200 French. The demand still remained greater than the supply. Advantageous openings present themselves as the following letter from a delegate to the Congress of Associated Chambers of Trade of the Empire will show :—

> SIR,—When I was on a visit to Canada this autumn, one of your citizens kindly presented me with a copy of 'The Statistical Year Book of Canada.' I have perused this with the very greatest interest, and it has enlightened me on many points of which I was previously ignorant. I was frequently reminded that Britons appeared to know very little about their premier colony. To help to correct this state of things, it would be to the general advantage if a copy of this valuable book could be sent to every free library and club in these islands. I do not know whether there are any funds available for the circulation of this information, but if not I should be pleased to make a small contribution towards the cost of distributing the same.
>
> (Sgd.) HARRY ALLCARD.
>
> Albert Works, Sheffield, November 16.

The plan of issue is to send first to the members of parliament and the government, the members of the several legislatures and the executives of the several provinces, the leading newspapers, boards of trade, banks, libraries, British consuls and other representatives in different countries, the legislative libraries, of other parts of the British Empire. The remainder is held for distribution in Canada according to a permanent list, and to meet applications. It is in connection with the permanent list and applications that the supply falls short.

The following are the dates of the issues of the Year Book:—

1896—Issued.......................October 12, 1897
1897— “ .......................October 4, 1898
1898— “ .......................October 10, 1899
1899— “ .......................August 21, 1900
1900— “ .......................June 22, 1901
1901— “ .......................May 15, 1902
1902— “ .......................May 28, 1903

The provincial governments, I am pleased to note, have co-operated most heartily in the effort to publish the Year Book at an early date. The municipal authorities have been prompt in supplying the material required, and the various commercial and manufacturing firms, from whom information was sought, kindly and most considerately gave their prompt attention to the circulars sent them.

There is a great demand for back numbers to make up full sets. The demand from the United Kingdom for full sets has increased very considerably. As a result the issues of 1893, 1894, 1895, 1896, 1898, 1899, 1900 and 1901 are exhausted. In order to put before the members of the congress of Chambers of Commerce of the Empire who met in Montreal in August last, the fullest possible information about Canada, I had a special edition of 500 copies of the Year Book prepared.

The Year Book in French is increasingly demanded. Of late years (1891-98) there remain very few copies, and of 1891, 1893, 1894, 1895, 1896, 1897, 1900 and 1901, none at all.

There has been a very considerable demand for other publications of the statistical division. The criminal statistics have been sought after by writers of other lands as well as by students in Canada. The handbook on Canada and the pamphlet on pulp wood were in demand in the Wolverhampton and Cork exhibitions, and the pulp pamphlet continues in demand.

The correspondence of the statistical branch increases steadily from year to year, due in part to the large edition of the Year Book issued and to the increasing demand for it, and also to the ever increasing demand for general statistical information by the public.

The whole respectfully submitted,

SYDNEY A. FISHER,
*Minister of Agriculture.*

# APPENDICES

# PUBLIC HEALTH.

## No. 1.

## REPORT OF THE DIRECTOR GENERAL OF PUBLIC HEALTH.

F. MONTIZAMBERT, M.D.Ed., I.O.S., F.R.C.S., D.C.L.

OCTOBER 31, 1903.

SIR,—I have the honour to submit this my annual report as Director-General of Public Health to October 31, 1903.

This year, like the ones immediately preceding it, has been marked by the continued threatening of bubonic plague, cholera, and smallpox.

Strict measures, ordinary and special, have therefore been required for the sanitary protection of the country. The special measures explained at length in my last annual report have therefore been continued throughout most of the year.

Frontier inspection for smallpox on threatened ports of the international border, and extra inspection at some of the ports have been maintained more or less throughout the year, as the conditions to the south of us seemed to require.

Owing to the diminution of smallpox in the United States, the exemption from routine inspection of vessels arriving from New York and ports north of it was again allowed by your ministerial order from August 15 last. And from that date also most of the frontier medical quarantine inspections were also suspended.

Since that date there have been a few local outbreaks of smallpox south of us, on account of which you have maintained or restored the frontier quarantine inspections. These are at present being carried out at Northport (protecting Rossland and Nelson), at Grand Forks and at Greenwood, B.C., on account of smallpox at Spokane and in that part of the State of Washington; at and below Morden and Crystal City, Manitoba, on account of an outbreak of the disease in North Dakota; at Sault Ste. Marie, on account of smallpox in the lumber camps of Northern Michigan ; and at McAdam Junction, N.B., on account of a recent occurrence of smallpox at and near Bangor, Maine.

On the Pacific side careful inspection of all arriving Asiatics has been carried out throughout the year. This includes the testing of the temperature and the examination of the glandular regions. Inspection of all vessels from San Francisco is continued on account of the presence of plague in that city. There have been five fatal cases of the disease there during this month.

Precautions as to funnels on hawsers, guarding of gang planks, &c., to prevent the embarkation of rats at ports of departure or their landing at our ports, have continued to be impressed upon the shipping companies.

*Dominion Department of Public Health.*—At the annual meeting of the Canadian Medical Association held at London, Ont., in August last, the following resolution was passed :—

Moved by Dr. Adam H. Wright, Toronto, and seconded by Mr. H. H. Chown, Winnipeg, that,

Whereas, this Association at its meeting in Montreal in 1902 placed itself on record by resolution to the effect that it is expedient that a Department of Public

Health be created by the Dominion Government, and administered under the authority of one of the existing Ministers of the Crown.

It is further resolved at this meeting to again press upon the attention of the government that Canada is not preserving her status among the nations in this branch of the public service, and that it is anomalous to have the various matters connected with the administration of public health so far as it appertains to the Dominion Government, spread throughout four or five departments.

It is further resolved that in the opinion of this Association the profession of medicine in the country being actuated in this matter solely in the best interests of the public welfare and with an earnest wish to place Canada on a par with other civilized countries, is entitled to expect that the Hon. the Privy Council of Canada will at an early date take this question into its best consideration, so that by the time our Association meets again in the autumn of 1904, we will be made officially acquainted with a decision.

That a copy of this resolution be transmitted by the secretary to the Right Honourable the Prime Minister, to the Honourable the Minister of Agriculture and to the Honourable the Privy Council of Canada, through the Hon. R. W. Scott, Secretary of State.

*Bubonic Plague.*—This disease has occurred during the year in South Africa, Australia, Bolivia, Brazil, Chili, China, Egypt, Formosa, France, Germany, Hawaiian Islands, India, Japan, Mauritius, Mexico, New Caledonia, Peru, Philippine Islands, Turkey, Straits Settlements, and in San Francisco.

In Cape Colony it has been present in Port Elizabeth, East London, King Williamstown, Queenstown, Graaff-Reinet, Burghersdorp, Stockenstroom, and Riversdale. On the 5th instant these places were all clear of the disease except Port Elizabeth, where the report on that day was that two cases of plague had been discovered during the week, a European male, and a native male. At the Plague Hospital two European males died during the week. Two cases remained under treatment. In Cape Town and Harbour Board area 672 rats were examined during that week; none were found affected with the plague. This disease also occurred in Natal, in Durban and in Pietermaritzburg.

In Hong-Kong plague prevailed as it has of late years, especially during the May-September season. The disinfection at this port of departure has been continued throughout the year. The report of the government bacteriologist for last year shows that 117,839 rats were examined, and of these 2,015 were found to be infected with plague. The disease this year has been the worst since 1894. The early diagnosis of plague is not always easy, even when the number of alternative diagnoses is very limited. In the East, where very many possible causes of pyrexia exist, difficulties in diagnosis must constantly beset the path even of those who are constantly on the outlook for plague. In this relation a communication from a correspondent of the *British Medical Journal* in Hong Kong is interesting, since from his connection with one or two native charities he is in close touch with both the people and the plague. This gentleman says: 'As an example of our difficulties, I may quote a case I had this week. A woman was admitted to one of our charitable institutions with a temperature of 102°, a dry tongue, and slight abdominal pain. Careful search was at once made for malarial parasites, but none were found. Irregular pyrexia persisted for a week, and suddenly, on the seventh day after admission, she complained of pain in the neck. A bubo in the submaxillary region rapidly developed, and she died twenty-four hours later. Her case might easily have been one of enteric or any other form of fever, and though plague was suspected and the woman on that account was isolated, there was nothing distinctive in her symptoms to indicate it until the occurrence of the cervical pain and swelling. Among Europeans the disease most likely to be confounded with plague is malaria with fever of a remittent type, and one is greatly handicapped because, before sending for a doctor, the patient has invariably dosed himself with 30 grs. of quinine, and of course the chances are ten to one that a blood examination fails to reveal the presence of the plasmodium if the case is malarial. I had two such cases yesterday, in one of which the man actually had an enlarged femoral gland which, however, I was able to trace to the irritation of a suppurative lesion in his foot. When a bubo is present and superficial, serum may be withdrawn from it, and, after suitable staining, the plague bacillus may be found, but generally by the time such a bubo develops hopes of recovery are fast vanishing. Blood examination for the bacillus of plague is unfortunately almost invariably negative. We never go out here without taking with us the few necessaries for making blood films, and we seldom return from the morning round of visits without two or three specimens. The daily plague returns at present number from 20 to 24 cases, but the actual number of cases is probably about four times this amount. The Chinese have the greatest horror of the thorough disinfection of their houses which is adopted by the sanitary authority, so that a Celestial no sooner gets fever than he packs up and takes the first boat to Canton, and, if he does not die on the ship *en route,* he usually succumbs shortly after his arrival.' These facts coming directly from one battling on the spot with this terrible scourge are highly instructive, and bear gratifying testimony to the care with which cases are investigated and the enthusiasm with which in Hong Kong the most recent and approved methods of research are adapted to the requirements of everyday practice.

At its meeting on June 4 the Sanitary Board reaffirmed its resolution to recommend the closing of the Chinese theatres during the plague season, instead of adopting the counter-recommendation—that they should merely be disinfected, and the audience obliged to wear feet coverings. This resolution was only carried by the casting vote of the president, the Hon. Dr. J. M. Atkinson, all the native members of the board being opposed to it.

It was also resolved to appoint a sub-committee to go again into the methods of disinfection, &c., employed, and see if they could not be modified in some way so as to lessen the temptation to the people to 'dump' their dead in the streets. The object of this 'dumping' is to avoid the disinfection and cleansing of their houses, to which the Chinese population have the strongest objection, so that if deaths occur from plague in their homes they secretly deposit the bodies in the streets. The number of bodies so dumped has steadily increased in every plague season, and represents 37·5 per cent of all known deaths this year.

A further decision was to recommend a Clayton sulphur dioxide apparatus for the disinfection of ships. This motion again was only carried by the casting vote of the president. The latter also made a communication as to investigations that are being made as to the possibility of infection being conveyed by food, especially in connection with fowls, some of which on sale in the market had been discovered to be plague infected. The Chinese, it was stated, prefer to eat fowls only half cooked, and use their entrails as a relish to rice. This inquiry is not yet complete. In the market 5 ducks, a chicken and a quail were discovered, all of which had died from plague. The birds had apparently been infected from the basement dwellings in the market, and these dwellings will no longer be allowed to be used. In this connection it may be pointed out that Dr. W. J. Simpson, during his recent visit to the colony, showed that monkeys, pigs, calves, sheep, hens, geese, ducks, turkeys and pigeons contracted the disease by feeding on infected material. These facts have a bearing on the mode of infection in man, and the prevalent view that he acquires plague mainly by inoculation. The fact that such a variety of animals can acquire the disease from their food suggests that he may also be so infected.

In China and in many oriental countries the domestic animals, such as fowls and pigs, live in close proximity to human beings, so close in fact that they are often under the same roof, and housed or allowed to wander about in the same apartment.

The consequence is that whether the human beings or the animals contract plague first either may infect the other, for each is liable to the disease. In this way the disease becomes endemic in a particular house or apartment, whilst other houses or apartments close by are free from plague.

Our attention has perhaps been too closely bestowed upon rats as the carriers of plague; for whilst pursuing that theory we have neglected the facts now brought to our notice that any or probably all domestic animals do suffer from the disease, and that a multitude of other foci of infection are at hand.

Of acute and chronic forms of plague in animals the latter is the more interesting from an epidemiological point of view. Professor Simpson finds that pigs may suffer from plague for weeks without betraying any symptoms of illness. He tells us that pigs with plague remain in apparently good health, even when their temperature is 103° F. or more; and it is only by carefully recording their temperatures that we have any evidence that they have departed from the normal. For three or four or more weeks the pig may suffer from high fever after contracting plague, but until a few hours before death it gives no sign or symptom of illness.

Turkeys may live after being infected for as long as 44 days, ducks for 54 days, geese for 35 days, sheep for 34 days, and so on. During all this time, however, the animals are giving off plague bacilli in their fæces and urine and infecting the parasites which inhabit their skin and its coverings. Men and animals which are brought into intimate contact with them are thus exposed to infection.

These new facts in connection with plague help us to understand its persistency, its endemicity, and the difficulty of its eradication, for it would appear that every living thing in proximity with a plague focus may contract the disease. The transmission of plague by ships is, in the light thrown on the subject by recent facts, keenly brought home to us. At plague-infected seaports every kind of device has been practised to prevent rats getting from the infected shore to the ship or from the infected ship to the shore. But whilst guarding against rats, the fowls, geese, ducks, turkeys, sheep and pigs may have been brought on board for purposes of consumption by the crew or passengers, or for transmission from port to port. Each and all of these animals, however, may be infected, suffering from chronic plague, and yet giving no sign or symptom of illness. The rats in the ship may be free from plague until the fowls come on board, yet it is only when these rodents die that plague is suspected. The discussion as to whether the rats are infected first and man afterwards, or vice versa, has raged for several years, but the varying evidence brought forward may find its solution in the fact that it was some other animal that infected both, and the rat and man developed the disease almost contemporaneously. Plague has frequently occurred whilst the rat remained free, as proved by the most careful bacteriological inquiry, and epidemiologists have, in their conviction that the rat and the rat only is the carrier of the disease, been led astray in their investigation. Plague appeared in Glasgow, but no rats were found infected until twelve months afterwards, and there can be no doubt that some other animal from on board a ship sailing from a plague-infected port was the conveyer of the disease.

The prophylaxis of plague, therefore, assumes a much wider proportion than has hitherto been bestowed upon it. Any and every animal received on board ship may possibly convey plague; it may be suffering from plague and yet show no signs of illness. The fowl will readily eat its food, and the pig's appetite will continue as voracious as ever even when the temperature of the former may be 107° F., and that of the latter 104° to 105°.

These are problems which the sanitary officer of the port must at once take in hand if plague is to be controlled. The one evidence of plague in animals short of examining the blood or excretions of the animal for plague bacilli is that of temperature; so that it comes to this, that the temperature of every animal previous to being received on board from a plague-infected port should be tested, and steps taken to weed out the apyrexic from the pyrexic—a laborious process no doubt, but it is the only means known to us at present how to separate the infected from the healthy. Not only, however, is it domestic animals that are known to be infected. The marmot in Mongolia was proved by Clemow to suffer from plague; bats were found to be infected in Naples; pigeons, which were until recently held to be immune, are now known to succumb readily to the disease; and the story of the crow flying over Rome, falling dead in the street, and infecting children with plague who picked it up, is readily explainable in the light of modern research.

What is wanted is a ready means of diagnosing plague in animals; for to take the temperature of each pig of a large consignment, or to examine the blood for plague bacilli is an ordeal the best equipped port officers could not possibly face.

Dr. F. W. Clarke, the medical officer of health of Hong Kong, in his report for 1902, published in the Government *Gazette,* states that 'the total number of cases of infectious diseases reported by registered medical practitioners during the year was 1,171, of which no less than 572 were bubonic plague and 410 were cholera.' Over 200 Chinese connected with the sanitary staff were inoculated with Haffkine's antiplague serum, with the result that not a single case occurred among the staff, whereas in the previous year out of 30 ratcatchers 7 are known to have died of plague, while 5 others left the colony sick, two of whom died at their homes in China. 'The results, therefore, of the Haffkine inoculation, coupled with strict discipline in regard to cleanliness and the wearing of leather boots when on duty were eminently satisfactory as regards the plague staff.' Clean bills of health have again been issued from Hong Kong from the 27th instant.

The Philippine Islands. Plague was present during the year at Manila and Cebu. The special correspondent of the *Medical Record* writes as follows: —

'Sanitary conditions in Hong Kong have a close relation to the public health in the Philippines, by reason of the great amount of traffic between Hong Kong and Manila and the short distance between these ports. Steamers make this distance, 600 miles, in two days, and sailing vessels in twice that time. Many Chinese are continually going back and forth, and much merchandise and foodstuffs are constantly being brought into Manila for their use. The occasional importation of plague infection into Manila can thus scarcely be prevented by ordinary methods of quarantine. While the late development of plague and cholera in Manila was undoubtedly due to relative inefficiency of the Manila quarantine service, the quarantine officials cannot be fairly judged as to the quality of their work, except in the light of a full knowledge of the geographical relations and existing sanitary conditions of Eastern Asia. That Dr. Perry and his excellent assistants were able to keep the original infections out for so long a time, and to prevent the introduction of new infections since these diseases first gained entrance, is just cause for hearty praise. If plague could not be kept out of San Francisco—three weeks from infected points by the fastest steamers and in communication with them by only relatively few boats—it was scarcely to be expected that Manila, within easy reach by small boats of a hundred infected points, and with a quarantine service which the shortness of the time since the abolition of Spanish sovereignty scarcely permitted to be brought into a perfected condition, would be able to escape unscathed. Japan, with its highly efficient and thoroughly organized quarantine service, lying at a greater distance from the infected ports, possessing a climate far less favourable than that of the Philippines for the multiplication of germ life, and with a peaceful population possessing the highest respect for laws and official control, has suffered to no small extent from both plague and cholera. Bearing these facts in mind, one cannot but feel that the quarantine officers in the Philippines deserve the highest credit for what they have accomplished in spite of the geographical and climatic obstacles already mentioned, combined with the existence in the Philippines, until lately, of a state of insurrection and anarchy.

'The newly constructed quarantine station for Manila, located at Mariveles, at the entrance to Manila Bay, is most comprehensive in plan and complete in detail and equipment, and is a monument to the energy and ability of Passed Assistant Surgeon Perry, U. S. M. H. S., who carried out the work of its construction during the troublous times of the insurrection, and in addition to the performance of his arduous duties as health officer of the port of Manila. The cost of construction of the buildings of the disinfecting station, isolation camp, and hospital amounted to $210,000. Under Spanish rule a quarantine station had been maintained at Mariveles, but the buildings were so old and the station so poorly planned and equipped as to be of little value in the work of reconstruction. Of these old Spanish buildings but two have been preserved, and these are used for offices, storerooms, and officers' quarters.

'Mariveles quarantine is distant thirty miles from Manila and directly inside the entrance to Manila Bay. It is located at the end of Mariveles Bay, a small harbour completely sheltered on nearly all sides by high mountains, having a sandy bottom, and affording perfect protection and anchorage. At low water there is a depth of 35 feet at the end of the short station wharf, so that the largest vessels can readily come alongside the disinfecting station. There is an abundant water supply of unimpeachable quality, piped from an uninhabited and uncultivated water shed three and a half miles away and delivered under sufficient pressure to throw water over any of the buildings of the station in case of fire. The disinfecting plant is completely equipped with bichloride tank, sulphur furnaces, fixed and portable formaldehyde generators, and two steam sterilizing chambers.

'There are ample disrobing rooms for the steerage passengers, and fifty shower baths for this class of passengers. On leaving the shower baths they receive cotton pyjama suits and pass into the waiting-room, where they remain during the disinfection of their clothing. Before entering the bath-house each passenger receives a numbered tag, which he ties around his neck during bathing. Any valuables he may have are placed in a box having the same number, and he is given a sack bearing the same number, into which his clothing is put after disrobing, and in which it is carried by an attendant to the disinfecting chamber, where it is exposed for twenty minutes to superheated steam at 240° F. At the end of this time the sack is taken out and returned to the passenger, who has finished his bath in the meantime. By this means articles are promptly returned to the owner without the loss or confusion incident to their becoming mixed with articles belonging to others. Shoes are disinfected by being dipped in bichloride solution. As the Chinese are particularly averse to bathing, attendants remain in the steerage bath-room to see that each person properly bathes himself with a sufficient use of soap. Two smaller bath-houses are provided for the bathing of first and second class passengers. In these the arrangement is somewhat different, there being a number of small disrobing and dressing rooms with the shower baths between. As some of the first-class passengers seem to delight in trying to evade the bath, an arrangement is being tested by which a passenger, on entering the bath-room, steps on a movable floor, which turns on the shower bath automatically, and thoroughly wets the passenger, who might then just as well continue the sometimes involuntary bath to which he has been subjected. General waiting-rooms, with comfortable chairs and reading matter, are provided in these smaller bath-houses. As the whole plant is built on piles over the waters of the bay, the dirty bath water, excreta, &c., create no difficulty as to their disposal. Two medical officers and about twenty-five men, of whom sixteen are Filipinos, form the personnel attached to the station. To show the efficiency of its operation, it may be mentioned that a large army transport with more than a thousand passengers aboard has been disinfected throughout in but ten hours.

'At the head of the wharf on shore are located the buildings of the detention camp hospital and offices. These, like the buildings of the disinfecting station, are well constructed of hardwood. The building for first-class passengers is of two stories, well ventilated and provided with small bed-rooms on each side of central corridors, each room having two beds and a window. The buildings for the steerage passengers are so arranged as to divide the passengers into five groups of two hundred persons each, no one group having any contact with another. The buildings are comfortable one-story affairs, with the kitchen in a semi-detached out-building. Bunks are constructed in three tiers, and split bamboo frames rest inside these bunks and form very comfortable beds. High fences of barbed wire separate each group, and these are so laid out that a single watchman guards the yards of all five groups. A small army post is located just outside the quarantine reservation, and the soldiers are used for guard duty and to enforce the maintenance of quarantine. The whole station is amply shaded and very attractive, while the cool sea breeze, which always blows, makes the climate far more pleasant than that of Manila. The Filipino attendants are said to be very efficient, even more so than the ordinary class of whites, as the pay given is so high as to secure the very best class of native labour. As Mariveles is shut in by an almost uninhabited and mountainous country, there is practically no communication by land, and its site for a quarantine station could hardly be improved upon. The station cannot be commended too highly.'

Japan.—While on the subject of quarantine in this part of the world, mention must be made of the methods in vogue in up-to-date Japan. The quarantine regulations of that country are largely modelled after those of the United States, as are their quarantine stations. The quarantine rules are most strict, as they necessarily must be with Chinese and Corean pestilence centres only two or three days away by steamer, and much commerce being carried on by the Japanese with ports on the mainland. The Japanese are thoroughly imbued with the idea that it costs less in lives and money to keep out a disease than to stamp it out after it has once secured a foothold. For this reason, and possibly also because they feel that their modern civilization is on test with foreign nations, they carry out their quarantine rules with strictest detail. On entering a Japanese harbour a boatload of quarantine doctors comes alongside, their quarantine launch being equipped with microscope and accessories for the purpose of making any desired bacteriological examination on the spot. Besides their own language, each of these doctors is able to speak at least one foreign tongue, so that English, French, German, Russian, Chinese and other nationalities can be questioned in their own language. Every passenger and member of the crew is lined up on deck, called by name, and the total number verified. While this is going on, the other physicians pass along the line, feel every man's pulse, make him put out his tongue, and if he shows any appearance of sickness they produce thermometers and take his temperature.

Nothing escapes them, and it is useless to try the old dodge of sending a man around the deck-house to be counted twice, for the place where every man not in the rank can be found must be stated, and these men are inspected and their condition verified while the count on deck is going on. It is also useless to expect that the condition of a sick man, sent on deck, will not be noted. Such men are set aside and carefully gone over by several of the quarantine doctors in a way which shows their proficiency in the latest methods of diagnosis and familiarity with modern diagnostic appliances. The disinfecting stations, as already mentioned, are modelled after those of the United States, but the Japanese go one better in that, after the bath, any drinks desired, except champagne, are served to the first-class passengers at the expense of the Japanese government. So carefully are the quarantine regulations observed in Japan that complete inspection of the crew is carried out even where vessels are making short runs from one port in Japan to another. Thus a vessel touching at Nagasaki and arriving at Kobe a day later would be again completely inspected, and returning at once to Nagasaki would be reinspected at the latter port with every detail required in the original inspection made on arrival from Shanghai or other infected port.

India.—India has this year suffered from the most serious epidemic experienced by that country since the disease appeared in Bombay in 1896. In March and April last the deaths from plague in India reached the enormous total of 5,000 daily. The official British figures are as follows : in 1897 the death list was 56,000. In 1898 it was 118,000. In 1899 it was 135,000. In 1900 it dropped to 93,000. In 1901 it was 274,000, and in 1902 it was 577,000. This makes the deadly total for six years of 1,253,000. But that is not all. During the first three months of the present year the deaths in India from plague were 331,000. Every year for seven years plague has diminished in May, and has remained at a low level throughout the summer months. Judging, however, from past experience, a recrudescence of this disease with increased virulence may be looked for in the winter and spring of 1903-4.

Mexico.—Plague occurred in Mexico during this year at Mazalan, Sequeros, Bogio, Teapole Ranch, and Villa Union. The deaths are stated to have been 330.

Brazil.—Plague reappeared in Rio de Janeiro last month, some 71 plague stricken patients having been in the Jurujaba Hospital on the 18th ultimo.

Chile.—Plague has been present in Valparaiso, Pisagua, Iquique, and nearly all the seaport towns.

Peru.—Plague appeared at the port of Pisco in May last, and also in Callao. It is supposed to have been brought in the rice in the cargo of the ss. *Serapis* from India.

France.—On September 9, five deaths were reported to have occurred at Marseilles from plague, and 16 cases were in addition stated to be under treatment for the same disease. On September 10, 29 cases of plague were officially announced by the authorities to exist. The outbreak occurred in a cardboard factory situated at Barnahé, a suburb of Marseilles, and is attributed to the importation of a number of bales of rags from Smyrna. In the rags a few dead rats were found, and the persons first infected were those engaged in handling the bales. Immediate steps were taken to prevent the spread of the disease, and there seems every reason to hope and believe that the outbreak has been suppressed. It is to be noted that the port from which the vessel with bales of rags on board hailed—namely, Smyrna—is a Mediterranean port. Plague was reported from Smyrna some time ago, but for several months past it has not been officially stated that plague existed there or in the neighbourhood. The factory was burned and all employed about the place were carried to a quarantine station. Two of the nurses tending the plague patients contracted the disease.

Berlin.—Dr. Milan Sachs, a young Viennese physician, died in June from plague in Berlin. He had studied the disease at Agram and other Balkan cities, and came to Berlin to continue his researches at the Bacteriological Institute, where he became infected with the plague. He was transferred to an isolated barrack, where he died June 5. The authorities adopted rigorous measures to prevent a spread of the plague. All the household effects of the family with which Dr. Sachs boarded were confiscated and burned, and all persons who came in contact with the dead man were segregated for observation. In consequence of this death the government decided to issue a decree forbidding further experiments with plague germs, the risk of spreading infection being considered more dangerous to the public health than the knowledge gained in studying the deadly microbes justifies. The decree forbidding further experiments was determined upon at a conference at the Ministry of Education of the sanitary and police authorities, in which the Emperor's physician, Dr. Leuthold, Professor Renvers, and other noted specialists participated. Dr. Sachs was sent to Berlin by the Austrian government, which intended to use his services in perfecting the sanitary arrangements in Bukovina.

All the persons who attended Dr. Milan Sachs during his illness were treated with preventive injections of antiplague serum, but one of them developed the disease. Possibly on account of the preventive injections, it had a very mild course and recovery was soon complete. The entire furnishings of the apartment where Dr. Sachs had lodged were taken to the disinfecting headquarters and burnt

San Francisco.—The Chinese district is presently undergoing a thorough systematic inspection. disinfection and cleansing under the direction of the officers of the U. S. P. H. and M. H. S. The agreement between the local board and the state board and the federal government went into effect February 9, 1903, and the work commenced will be maintained for at least one year from said date. In accordance with their plan, a body of picked physicians, interpreters, inspectors and detectives are daily inspecting the streets and houses, together with their families or inmates, sick or well, throughout the Chinese district. The sanitary condition and arrangement of each structure are examined room by room; the Chinese, sick and well, carefully observed; a corps of men. headed by an experienced disinfector, supervised by federal officers, disinfect with carbolic solution all rooms, hallways, alleys, and areas requiring same. The plumbing in the houses throughout the district is under the careful inspection of trained inspectors. and alterations and improvements are required whenever needed. This board, acting upon the complaint and report of the inspection force. has condemned and will continue the vacation and condemnation of unsanitary and unsafe structures. The streets and alleys of the Chinese districts are three times a week sprinkled by improved methods with a solution of corrosive sublimate, sewers are flushed throughout the district twice a week, chloride of lime distributed under medical inspection and instruction. wherever it may be required.

Under the supervision of experienced sewer men. trays. especially prepared, containing a preparation of phosphorized paste, are widely distributed throughout the sewers in the Chinese district, and the rats are using this bait in large quantities, and with fatal results. In addition to this specially constructed traps are set in sewers and above ground in the Chinese district and along the water front, and the captured rats. as well as those found dead in the sewers. streets and houses. are submitted to examination by the bacteriologist of the Public Health and Marine Hospital Service and city bacteriologists.

Following is the record of work in Chinatown for week ended October 24:—

| | |
|---|---|
| Building reinspected | 130 |
| Rooms | 1,030 |
| Persons inspected | 1,206 |
| Sick | 34 |
| Sick prescribed for at oriental dispensary | 17 |
| Dead examined | 8 |
| Necropsies | 8 |
| Provisional diagnosis of pest | 3 |
| Rats examined bacteriologically | 11 |
| Places limed and disinfected | 750 |
| Times streets swept | 3 |
| Sewers flushed | 17 |
| Notices to abate plumbing nuisances | 30 |
| Plumbing nuisances abated | 9 |
| Undergoing abatement | 19 |
| Total number of plumbing inspections | 89 |

PLAGUE in the United States, as reported to the Surgeon-General, Public Health and Marine-Hospital Service, December 27, 1902, to October 30, 1903.

| Place. | Date. | Cases. | Deaths. |
|---|---|---|---|
| California – | | | |
| San Francisco | Dec. 11 | 1 | 1 |
| " | Mar. 16 | 1 | 1 |
| " | June 5 | 1 | 1 |
| " | July 15 | 1 | 1 |
| " | July 19 | 1 | 1 |
| " | July 20 | 1 | 1 |
| " | July 29 | 1 | 1 |
| " | Aug. 9 | 1 | 1 |
| " | Aug. 21 | 1 | 1 |
| " | Sept. 13 | 1 | 1 |
| " | Oct. 7 | 1 | 1 |
| " | Oct. 20 | 1 | 1 |
| " | Oct. 23 | 1 | 1 |
| " | Oct. 23 | 1 | 1 |
| " | Oct. 29 | 1 | 1 |

A summary of cases since March, 1900, when the first case was officially reported, is as follows: Calendar year 1900, cases, 22; deaths, 22. Calendar year 1901, cases, 30; deaths, 25. Calendar year 1902, cases, 41; deaths, 41.

Total cases of plague from January 1 to October 30, 1903, 14.

Total cases San Francisco to date, 107; deaths, 102.

British Columbia.—No case of bubonic plague has been reported or observed at the William Head quarantine station. As an instance, however, of the continuous threatening of this disease at British Columbia ports, may be mentioned the circumstances connected with a voyage of the Nippon Yusen Kaisha liner the ss. *Kaga Maru* in June last. This vessel left Seattle May 30, and upon her arrivel at Yokohama one of the crew, a Japanese, who had been ill for two days, was still suffering. As the symptoms were suspicious, the vessel was not allowed to enter the harbour, and the man was kept under observation for 48 hours. An examination revealed the presence of plague bacilli. In order to confirm the diagnosis a culture was made of the bacilli, when all doubts were removed as to the nature of the disease. The vessel was immediately ordered to the quarantine station for ten days' detention.

The passengers travelling by the *Kaga Maru* numbered 13 in the saloon, 7 second class and 48 steerage. Out of the 13 saloon passengers 7 were foreigners, while there were 3 foreigners in the second-class. The majority of the steerage passengers were Chinese. The cargo was disinfected at Nagahama prior to its being landed and delivered.

The large quantity of flour carried on board the *Kaga Maru* was exposed to the sun before delivery, while other articles were disinfected with carbolic acid.

In connection with the quarantining of the *Kaga Maru,* the Japan *Herald* says: 'The outbreak of plague on the *Kaga Maru* raises one or two interesting questions. The *Kaga Maru* left Seattle on May 30, and arrived here on the 15th instant. She was thus 14 clear days between ports. It is generally calculated that a case of plague takes from 7 to 10 days to develop, and if this be correct the man who is now suffering from the disease was infected on board. Otherwise Seattle must be considered as an infected port, a condition which there is no reason to suppose correct. On the other hand, it is difficult to understand, if the vessel was infected on her outward voyage, why only one of those on board should be attacked and why such a long time should have elapsed before the disease manifested itself. If the vessel was infected on her outward trip the disease must have been spread by the rats on board, which was presumably the way the disease was carried to Sydney some two or three years ago. The steamer did not call at the ocean docks at Victoria, B.C., when bound outward as usual, her passengers being put on board in the Royal Roads.

The ss. *Hyades* lost her head steward from plague while at Hong Kong in April, and the ss. *Indrasamha* landed a case of plague at quarantine in Keeling, Formosa, in July. Both of these vessels, like the *Kaga Maru*, ply to British Columbia ports.

*Plague and fleas.*—Simond's theory that fleas travelling from rats which have died from plague have frequently bitten human beings and thereby disseminated the disease has up to the present met with little favour among those who have closely investigated the malady. Simond's view, as set forth in *Annales de l'Institut Pasteur*, Vol. XII., 1898, p. 628, is as follows: 'The idea of transmission by means of a parasite, which would seem to be the conclusion drawn from clinical experience, is in accordance with the invasion of sick rats by fleas, which several hours after death abandon the cadavers to attack other animals and man.' This is confirmed (1) by the presence of the specific microbe in the intestinal contents of the flea; (2) by other certain peculiarities of transmission from rat to man, and from man to man, in which latter case it is possible that other parasites, more particularly the bedbug, may intervene; (3) by the possibility of the transmission of plague to a healthy rat by his cohabitation with an infected rat with fleas, when such cohabitation of healthy rat and flealess infected rat is uniformly innocuous. The great stumbling-block to an acceptance of Simond's theory has been the assertion made by several authorities—and especially by Professor Galli Valerio—that fleas from rats will not bite human beings. Now, however, Dr. Frank Tidswell, of Sydney, well known for his studies and reports on plague, has come forward with the statement that some of the fleas which infest rats will bite human beings. He writes thus in the *British Medical Journal*, June 27: 'In opposition to Simond's hypothesis that bubonic plague is disseminated by fleas from infected rats, it has been urged that the fleas of rats will not bite human beings. Simond himself, while admitting his inability to pronounce upon the species of fleas found by him upon rats, nevertheless clearly states that they bit human beings upon which they were placed. Prof. Galli Valerio, of Lausanne, has reported that the species of fleas found by him upon rats are *Typhlopsylla musculi* and *Pulex fasciatus*, and that neither of them will bite man. Simond's observations were made in India and Valerio's in Europe, and it seemed by no means improbable that their conflicting results were due to the fleas found by them being of different species. It does not follow that the fleas harboured by rats in two widely different places would be exclusively of the same species. With a view to determine this point, a collection of fleas was made from the rats coming under my examination during the recent epidemic of plague at Sydney. Of 100 fleas obtained 10 were identified as *Pulex fasciatus*, 8 as *Typhlopsylla musculi*, 1 as *Pulex serraticeps*, and 81 as *Pulex pallidus*. It will be seen that no less than four species were represented, and most abundantly one (*pallidus*) not hitherto mentioned, as far as I am aware, as occurring on ordinary rats. Its stated hosts are *Mus albipes* of Socotra and *Herpestes ichneumon* of Egypt. This species bit in laboratory trials, as did also *Pulex fasciatus* upon one occasion. *Pulex serraticeps* is well known to attack man. The remaining species, *Typhlopsylla musculi*, did not bite us.' Dr. Tidswell announces that an official report on the matter will be forthcoming soon, and remarks that in the meantime it may be noted that the results of his observations tend to remove an otherwise fatal objection to Simond's views.

*Danysz's Virus.*—Assistant Surgeon Donald H. Currie reports to the Surgeon General of the United States Public Health and Marine Hospital Service, March 31, as follows:—'February 2, I received two tubes of this virus from the Pasteur Vaccine Company. February 4, I mixed one tube with half pound of rye bread, in accordance with the directions printed on the tube, and fed it to 9 rats. February 13, the rats began to sicken, so I separated them, putting them into different cages, each rat into one cage. February 15, all rats had sickened in series 1. In these cages I placed 22 other rats and named these latter, series 2. On February 17, 2 rats of series 1 died with typhimurium infection. From that date to February 28, inclusive, 8 of the original 9 rats died from the same cause, all of them in series 1. From February 20 to March 1, 5 rats of series 2 died. During this time all of series 2 were more or less sick, but 17 recovered. On March 13 all the rats which had not died had made a complete recovery, and had gained in weight to that before infection. They were chloroformed on this date.

From the above it will be seen that in series 1, that is to say, those rats which actually ate the virus, there was a mortality of 88·7 per cent, which would compare favourable with any of the ordinary poisons, such as phosphorus, &c., without any danger of poisoning other animals and human beings, as is the case in inorganic and organic poisons. In series 2, however, the mortality, as will be seen, was only 22·7 per cent, and when it is taken into consideration that those rats were confined in close quarters, which would not be attainable under natural conditions, it is probable that there would be little or no transmission of the disease in wild rats when at large. An interesting thing in this connection was noted, namely, that the healthy rats when placed in with the infected ones, avoided the latter as much as possible. The conclusions which this experiment would lead one to draw are that the virus is efficient when actually fed to the rats, as is done with other poisons, and that it has not the dangers which phosphorus and arsenic possess; but the claim that the disease would be transmitted from rat to rat is probably only admissible in the laboratory, and is therefore impracticable of application in the destruction of the rats of a city.

*Destruction of rats on shipboard.*—Nocht, harbour physician, and Giemsa, chemist, both of Hamburg, recognizing the important part played by rats in the transmission of plague, have performed a large number of experiments with a view of determining the most effectual means of destroying them in the holds of ships. The objections to the use of edible poisons are obvious, and of rat-killing animals, ferrets are alone really useful. They have, however, distinct disadvantages: First, they attack other animals, particularly birds; secondly, they require extreme care, especially as regards feeding; thirdly, they have but little resisting power against cold; and lastly, they cannot penetrate into corners quite so well as their prey. It thus appears necessary to kill the rats by the means of a poisonous vapour; for this purpose burning sulphur has been employed, at least 10 kilog. being required for every 1,000 c. m. of storage space. In order to obviate the danger of fire caused by the combustion within a closed space, bombs of sulphurous acid have been used, and also a substance called piktolin. which consists of a mixture of sulphurous and carbonic acids. The disadvantages of this are, first, that the hold must be almost cleared out before it is introduced, and, secondly, that it must be led on through a complicated series of tubes, as otherwise it does not diffuse equally. Piktolin acts much more rapidly than burning sulphur, but is about twice as dear. Recently the Clayton Fire Extinguishing and Ventilating Company has introduced an apparatus in which sulphur is burnt at a high temperature, and sulphurous together with a little sulphuric acid produced. The process. which is one which has been in use for disinfecting purposes for years, occupies some fifteen hours. and requires the combustion of about 1 lb. of sulphur per 250 cubic feet of hold requiring to be cleared. It is claimed that this method. while absolutely fatal to the rats, does not injure the cargo; but the authors consider that this is only true of dry goods. Many substances. particularly fruit and other provisions, absorb the gases. and are thereby damaged. Moreover, the repeated use of the apparatus is not without harmful influence upon the vessel itself. Further experiments were carried on with carbonic acid gas. It was found that 30 per cent of this must be present in the atmosphere before the rats are killed with certainty. It is best employed in the liquid form in steel cylinders, but is very expensive, and moreover so slow in its action, that the animals frequently have time to escape from its influence to places of safety. The writers finally come to the conclusion that the sole agent, by the use of which all the preceding objections can be obviated, is carbon monoxide. This has no smell, exerts no chemical action upon the cargo or the vessel, is cheaply manufactured, and rapidly kills rats and mice. The use of this gas was suggested by Haldane, but the authors consider that their method of producing it is safer as regards the risk of explosion. They manufacture it by heating coke in a generator and driving through the upper surface a current of compressed air either alone or alternately with aqueous vapour. By this means a gas is produced consisting on an average of 5 volumes of carbon monoxide, 18 of dioxide and 77 of nitrogen. The gas is introduced into the hold by tubes passed down through the ventilators, and a volume equal to about three-quarters of the cubic contents to be cleared is employed. There is no difficulty in allowing the escape of the gas by opening the ventilators when it has done its work; if necessary men in diving helmets can be sent to open the windows. Goods of all kinds after twelve hours' exposure to the gas were found quite unaltered. Details are given of experiments made upon various ships, in all of which every rat and mouse succumbed to the gas. In one particular case several of these animals were found to be infected with plague. The cost of the method is comparatively moderate; the original apparatus for a large harbour would come to some £2,000, but that having once been set up, each individual ship can be cleared for from £3 to £4. If further experiments confirm these views, it may become expedient for us to install the apparatus for the generation of this gas at our stations and harbours for the destruction of the plague-carrying rat on shipboard.

*Haffkine's Prophylactic.*—In answer to the questions which have been raised:—

1. As to the length of time during which Haffkine's prophylactic renders a person immune.

2. As to the length of time before it acts.

3. Whether it is injurious to those who are incubating the disease ?

4. Why, in spite of England's systematic efforts to exterminate the plague, so little has been accomplished ?

5. Whether the inoculation increases the liability to other diseases ?

6. Whether Haffkine's prophylactic is of real value in reducing the plague mortality, since the latest reports from Bombay seem to show an increase in the plague death rate ?

Dr. B. R. Slaughter, of Washington, D.C., sums up the benefits of the prophylactic as follows :—

1st. It renders a person immune for 3 months.

2nd. It acts within 24 hours.

3rd. When inoculation is given in incubation stage of disease, that is, before signs of plague appear, it has, in many cases, the power to abort the disease.

4th. Inoculation has no effect on other diseases, except, possibly, eczema, which appears to be benefited by it.

5th. Inoculation confers a high degree of immunity, and greatly reduces the number of plague attacks.

6th. When, in spite of inoculation, a person is attacked, his chances of recovery are greatly increased.

The 4th of the above questions, and incidentally the last portion of the 6th, Dr. Slaughter answers as follows :—

4. Why in spite of England's persistent efforts to exterminate the plague, has so little been accomplished ? For this there are several reasons.

1st, because the earnest and intelligent work which is being done covers, after all, a comparatively small area of the great Indian empire.

2nd, because, even if every case of plague in a town is cured to-day (after general inoculation the plague disappears in from 30 to 47 days), and the villagers persuaded to adopt the most hygienic conditions of living, by next year, their fright having passed, they will grow lax and indifferent. Many who have learned something of hygiene will have left on business or pilgrimage, and others will have come in from neighbouring towns bringing with them utterly unhygienic customs. One of these that assists in rapidly spreading the plague in pneumonic cases is that the patients expectorate into the hands of their sympathetic attendants.

3rd. Natives who fly on the outbreak of the plague and live in shacks built on moist ground and among whom ambulant cases develop, when they return bring with them attenuated bacilli, which under favourable conditions regain their virulence, and precipitate a new epidemic as soon as winter causes the people to come again in to close quarters.

4th. There will also be Mohammedans returning from Mecca, and Hindus from Benares, who will have been in contact with plague sufferers from Egypt, or other parts of the orient, on the one hand, or with plague contacts from thousands of native villages on the other. Since Dr. Calvert reports that the bacillus remains viable and virulent on dried pulverized organs of animals dead of the plague for as long as 48 days, and on paper or silk, in a room at ordinary temperature in the sunlight, for 18 days, it is easy to realize how readily infection is carried in the dark folds of oriental garments, for it has been demonstrated that bedding and clothing may harbour bacilli for months, and in experiments they have been kept alive in crash for 97 days.

In the laboratory experiments conducted by Dr. Rosenau, of the Public Health and Marine Hospital Service, and director of the hygienic laboratory at Washington, he discovered that the plague bacillus lived and remained virulent 16 days in one case and 96 in another when abundantly inoculated into water containing organic matter. Now, every one familiar with India and her numerous sacred tanks and wells, sheltered from the sun, and fetid with the decaying floral gifts constantly thrown into the waters by devotees, will at once recognize that here is one of the perennial sources of the bacillus pestis. Dr. Rosenau found further that 'the bacilli are long kept alive in moist, cool earth,' and as the dark, native huts are almost invariably built directly upon the ground, which is kept moist by water from these same tanks used in pouring libations to the household gods, it will be seen that all the conditions which laboratory research shows to be most favourable to the growth and preservation of the bacilli are actually and constantly in existence in the country most devastated by them.

These are some of the reasons why the work of the British government in India has to be done over again every year.

*Cholera.*—Lord Cromer quotes the following extract from a report by Sir Horace Pinching, dated February 3, 1903:—

'If further evidence were needed to prove that cholera is chiefly a water-borne disease, the late epidemic in Egypt afforded ample.

'During the period since the 1895-6 epidemic of cholera, a certain amount of work has been done in the larger provincial towns to protect as much as possible the water supply from pollution, and some have been supplied with water drawn from deep tube wells. In none of these towns did the disease assume an epidemic form ; cases occurred in most of them, but the majority were imported from adjoining villages.

'Several gangs of men were trained for the purpose of boring Abyssinian tube wells, and in villages where cholera broke out, which depended entirely on well water for drinking purposes, one of these gangs was sent on and several pipes were driven, and a supply of pure water for the village obtained. The rapid way in which the disease ceased in such villages was most marked.

'At the commencement of the epidemic, Birch Bey, of the Daïra-Sanieh, very wisely had Abyssinian wells made in all the villages belonging to the Daïra-Sanieh administration between Rodah and Bibeh, in Upper Egypt. These villages contain some 22,000 inhabitants, and, though the towns and villages all around them were more or less seriously infected, only 196 deaths took place from cholera among the villagers on the Daïra-Sanieh property. This immunity from the disease was no doubt due to the pure water supply, and the excellent control over the villages exercised by Birch Bey himself.

'The villagers as a rule accepted most readily the water from the Abyssinian wells, and only in some cases were the pumps destroyed and the tubes wilfully filled with rubbish by the inhabitants.

'At Keneh, situated some two miles from the river, and which formerly drew its water from wells and a stagnant backwater of the Nile, an engine, with pump, &c., was erected about eighteen months ago on the Nile. The result of this was very remarkable, only one case of cholera occurring in this town of 27,478 inhabitants, whereas during the epidemic of 1896 no less than 422 cases were registered.

'In Medinet-el-Fayoum, where much has been done to prevent the Bahr Yousef becoming polluted, a similar result was observed, though not so marked, 368 cases occurring in that town in 1896 and only 87 in 1902. As the Bahr Yousef is the main supply for the whole Fayoum province, the diminution in comparison with 1896 was marked throughout this province, 2,183 occurring in 1896 and 1,001 in 1902.

'In other towns, such as Assouan, Beni-Suef, Mit-Gamr, Zifta, &c., the same results were remarked.

'During the epidemic of 1896, Cairo experienced a sharp recrudescence of the disease when the old Khalig was opened and the people began to take water for drinking purposes from this highly infected source. Since then the Khalig has been completely filled in; another canal, however, remained—the Boulakia, similar to the Khalig, in that it was dry the greater part of the year, and, while dry, served as a public latrine to the inhabitants of Boulac, the quarter through which it passed, which is one of the most crowded and dirty parts of the city.

'Had this canal been filled with water during 1902, Cairo would no doubt have experienced a similar recrudescence of the disease to that of 1896, but at my earnest suggestion the part of the canal which passes through the city was filled up, and a new head made on the river for the purpose of leading water to that part of the canal outside the city which serves for irrigation purposes.

'Great thanks are due to Mr. Webb, Mr. Langley, and to the other public works officials who carried out this work so promptly, as the Nile was rising rapidly at the time, and had not the work been taken in hand at once it would have been impossible to prevent the water from filtrating into the canals.'

Provision has been made for an annual expenditure of £E10,000 to provide Cairo with free taps, and an arrangement has been made with the Cairo Water Company to improve the quality and increase the supply by furnishing water from artesian wells. The government will contribute £E20,000 towards the cost of installing the new system.

The question of the water supply of Alexandria was still undecided when the report was drawn up, but it is stated that the system of rapid sand filtration appears to be best suited to all the circumstances of the case. Much has been done during the last five years to improve the water supply of other towns, but much remains to be done, though Lord Cromer anticipates that next year he may be able to state that a plan has been adopted.

At a meeting of the Manila Medical Society on the 7th of last month, Dr. R. P. Srong considered the subject of protective inoculation against cholera under several headings, briefly summarized as follows:—The work previously done on artificial immunity by Ferran, Haffkine, Kolle, Buchner, Metchnikoff, Roux and others was considered. While it is admitted that Haffkine's method, when properly applied, gives rise to good immunity in the inoculated, the local reaction is too great for the method ever to come into general use. Subcutaneous injection of either living or dead cholera vibrios produces more marked general symptoms and local reaction than does the injection of either killed plague or typhoid bacilli. The location of the specific toxin was next considered and evidence brought forward to show that the substance existed as an integral part of the living organism, and was set free only by the death of the same. In the author's form of inoculation, the cholera 'receptors' were obtained from bodies of the bacteria by means of autolytic digestion. The proteolytic ferment produced by this organism brings about this result in a very satisfactory manner. This ferment is not destroyed at 60° C., and, therefore, the bacteria may be killed by careful heating from one to two hours and digested from two to five days by this ferment, and then passed through a Reichel filter. Such a filtrate when injected into animals gives rise to autotoxic, bactericidal and agglutinative substances in their blood serum, and, moreover, protects them from the injection of fatal doses of living cholera spirilla. As the local reaction produced is very mild, such a filtrate offers itself as a practical form of protective inoculation in man. This filtrate may be evaporated and used in powdered form.

Cholera has been present during the year in Brazil, China, Dutch India (Java and Batavia), Egypt, India, Japan, Philippine Islands, Straits Settlements, Syria and Turkey.

*Yellow Fever.*—The observations and literature of the year in connection with this disease confirm the belief in the part played in its dissemination by the mosquito *Stegomyia fasciata,* acting as an intermediate host for the yellow fever parasite.

In the early part of 1902 Dr. George E. Beyer, Professor of Biology in Tulane University, and Dr. O. T. Pothier, Pathologist to the New Orleans Charity Hospital, with Assistant Surgeon Herman B. Parker, were sent by the surgeon-general of the United States army as an expedition to study yellow fever, especially its etiology, in either Mexico, Central America, or South America. The expedition began work at Vera Cruz on May 12, 1902, and continued till near the end of October. Examinations of material brought from Mexico were prosecuted in the United States up to the date of the report, February 17, 1903. The report was issued in March, 1903. The conclusions reached are, we learn from an analysis of the report given in the *New York Medical Journal,* as follows: 1. Bacteriological examination of the blood of persons with yellow fever during life, as well as of the blood and organs immediately after death, in uncomplicated cases, is negative. 2. The mosquito known as *Stegomyia fasciata,* when allowed to suck the blood of a yellow fever patient after the lapse of forty-one hours and a half after the onset of the disease, and subsequently fed on sugar and water for twenty-two days and an hour and a half, can, if permitted to bite a non-immune person, produce a severe attack of the disease. 3. *Stegomyia fasciata* contaminated by sucking the blood of a yellow fever patient, and then killed, cut into sections, and appropriately stained, presents with regularity a protozoon parasite, *Myxococcidium stegomyiae,* that can be traced through a cycle of developments from the gamete to the sporozoite. 4. *Stegomyia fasciata* fed on the blood of a person with malarial fever, on normal blood, or artificially, does not harbour the myxococcidium.

As regards the question whether or not *Stegomyia fasciata* is the only means of transferring the disease, the report says: 'To prove a negative assertion, conditions must be supplied to produce the disease at will or under constant conditions. In the whole history of the disease such data, to this date, are wanting. When one instance occurs and can be repeated the new factor can then be taken into consideration.' The name *Myxococcidium stegomyiae* is given tentatively to the sporozoon, though its classification among the *Haemosporidia* is 'based entirely upon practical considerations of convenience rather than upon a conviction of its exact position,' since its schizogonic cycle has not yet been observed.

Though the subject of the conveyance of mosquitoes by ships was not studied in detail, owing to lack of facilities, some interesting observations were made. It was found that wooden water tanks were more likely than iron ones to be contaminated, owing to the fact of their being less carefully cleansed, also that the well of the carpenter's grindstone was a favourite place for the breeding of mosquitoes. Advice is given as to the screening of rooms in which yellow fever patients are placed.

Balfour calls attention to the fact that the bilge water of steamers is often swarming with a larvæ of mosquitoes, and that attention should be given to this fact. A ship-bred mosquito might very well pay a flying visit ashore and come back infected and spread the epidemic in its acccustomed quarters.

Assistant Surgeon Grubbs, of the United States navy, in charge of the gulf quarantine station, has, we learn from the *Medical News,* issued a report of an investigation which he has made with the object of deciding to what extent and under what circumstances mosquitoes infected with yellow fever germs can be carried by vessels. From June to November, 1902, he inspected vessels arriving from ports where the presence of the *Stegomyia* render them liable to infection. Of the 82 vessels from possible yellow fever ports, 65 had no mosquitos on board at any time during the voyage, 5 had the insects on board at the port of departure, 9 reported the appearance *en route* of *Culex,* or harmless mosquitoes, and three brought *Stegomyia* to the station. All three of the last group were from Vera Cruz, a yellow fever port, and the voyages lasted on an average 17 days. Surgeon Grubbs formulates the conclusions to which his investigations have led him as follows: First, that mosquitoes can come aboard a vessel under favourable conditions, when the vessel is not over 15 miles from shore; secondly, that *Stegomyia* can be carried from Mexican or West Indian ports to those of the Gulf States ; thirdly, that they can board a vessel lying at anchor half a mile or less from shore, being conveyed by the open lighters used or flying aboard; and, finally, that a vessel moored a short distance from land may become infected with yellow fever, old beliefs to the contrary notwithstanding.

This disease has been present this year in Brazil, Colombia, Costa Rica, Ecuador, Mexico, Nicaragua, Texas, and Venezuela.

In Havana there has not been a case of local origin for two years. Nine cases have been imported this summer, but having been so protected that they could not be bitten by mosquitoes, no other cases were occasioned by them.

In a report to Surgeon-General Wyman, of the United States Public Health and Marine Hospital Service, under date of the 23rd instant, Dr. Guiteras describes as follows the character and application of the disinfecting material, &c., used in screening houses in the suppression of the present epidemic of yellow fever in Laredo, Texas:

The term 'disinfecting material' includes everything utilized in the prevention of the spread of yellow fever, based upon a complete acceptance of the fact that the mosquito is the only means of transmitting the disease. It therefore includes disinfecting material, as usually understood, such as sulphur, pyrethrum, &c., and also lumber for screening purposes, mosquito and wire netting, oil, wooden faucets, &c.

The methods instituted are as follows: There are three screening and five disinfecting crews. When a suspicious or positive case of yellow fever is reported, a screening crew is at once sent to the house, with a cart containing the necessary material, and the patient is immediately screened—the carpenters putting in ready-made screen doors or windows, or, when these are not available, making them on the spot. Where screening is impossible or impracticable, the patient is placed under a mosquito bar. The disinfecting crew follows immediately after the screening crew and disinfects that part of the house not occupied by the patient. On the conclusion of this disinfection the patient, if able to be moved, is transferred to one of the disinfected rooms and his room disinfected.

All water containers in a house are covered with oil, and faucets inserted in the barrels of drinking water.

Sulphur and pyrethrum are used in disinfection, the former where there is no danger of injury to the contents of the room, the latter where such injury may be apprehended. Where pyrethrum is used care is taken to sweep the room, so as to collect all the mosquitoes that may have been simply stunned by the fumes of the powder.

In the disinfection large quantities of paper strips are used in order to make the rooms air-tight. In some of the houses it is necessary to paper almost the entire building.

William Lyman Underwood, writing in the *Popular Science Monthly* with regard to the length of life of the mosquito, says that it is not known just how long mosquitoes can live, but their average life is much longer than ordinarily supposed. Thousands of them live through the winter, hibernating in dark places in barns or house cellars. In sparsely settled localities, where they cannot find such places for shelter, they live through the winter in hollow trees, in caves and holes under upturned trees. Even though the temperature may fall far below freezing, they are not winter killed, but on the approach of warm weather become active again. Mosquitoes are frequently seen flying about in the woods before the snow has wholly left the ground.

*Smallpox.*—This disease has prevailed extensively throughout the year, appearing in Argentina, Austria-Hungary, Barbados, Belgium, Brazil, British Guiana, Canary Islands, Chile, China, Colombia, Costa Rica, Cuba, Ecuador, Formosa, France, Germany, Gibraltar, Great Britain, Hawaiian Islands, Honduras, India, Italy, Jamaica, Japan, Corea, Malta, Mexico, Netherlands, Newfoundland, Philippine Islands, Porto Rico, Russia, Spain, Straits Settlements, Switzerland, Trinidad, Turkey, Uruguay, Venezuela, West Indies.

Smallpox continued in widespread form in the United States, some 26,937 cases having been reported for the first six months of this year, and some 10,419 from July 1 to this date.

This disease has continued therefore to threaten us throughout the year, on the Atlantic and Pacific seaboards, and from the neighbouring republic along our frontier. This has necessitated the maintenance from time to time at different places of inspectors and guards at those of your unorganized inland quarantines where the threatening has seemed the most serious. There have been also outbreaks of the disease in different parts of the North-west Territories.

Smallpox has been brought to some of your maritime quarantines also.

In each instance the disease was stamped out at the quarantine station.

Its continuance and spread seem still to be due, in part at least, to continued errors in not recognizing it, although it appears difficult indeed to understand how a diagnosis of chickenpox can everywhere be a sufficient explanation of a large number of cases of an infective eruptive disease occurring amongst other persons than small children, and causing occasional deaths.

In the spring of this year Prof. W. T. Councilman, of the Harvard Medical School, announced his discovery of the micro-organism that causes smallpox. Dr. Councilman stated that for two years the study has been carried on under his supervision by Drs. Brinckerhoff, McGrath, Tyzzer and Thompson in the laboratories of the smallpox hospital at Galloupes Island, and in the Detention Hospital on Southampton street, with the cordial co-operation of the Boston Board of Health.

All the material obtained was brought to the Harvard Medical School and thoroughly studied there. First vaccinia was studied and then the contents of the vesicles and pustules, but no definite germ could be here detected because of the vast number of bacteria of varying kinds always present. Finally an anatomic study of the lesions of the disease revealed the organism with its definite cycles of development. In the deep epithelial cells of the skin there were found bodies one micron in diameter, which have also been noted by other observers. They stain easily, are homogeneous, increase in size, their structure gradually becomes granular, their shape irregular, and they are surrounded by little circles more or less resembling amœbæ. Occasionally segmentation is evident, the organism splitting into a number of segments.

This is a distinct cycle. There is no change in the nuclei, a vacuole surrounds the organism and grows with it. Suddenly it disappears and peculiar changes are noted in the nuclei, a ring appears and grows, rings appear in its periphery and its structure becomes sponge-like. This finally fills the whole nucleus, which degenerates and sets free the body. It does not much further increase in size, but the structure becomes more complex, the ring-shaped bodies appear, one micron in diameter, and it breaks up into these 'spores.' We have thus, as in other protozoa, two cycles, the intracellular and the intranuclear, the latter more complex and corresponding to sexual development.

In vaccinia we have only the first cycle, and this is the case also when the rabbit is exposed to smallpox. The monkey being nearer to man, however, gives both cycles. The whole process is complete when the vesicles begin to form. These stages are not found in the vesicles, pustules or crusts, but the 'spores' have been found in the blood vessels of the skin. These are probably not the only cause of the later eruption, but prepare the way for the streptococci. Professor Councilman showed a beautiful series of lantern slides made from micro-photographs which fully and clearly substantiated each of his statements.

Professor Calkins, professor of zoology at Columbia University, was present and agreed with Professor Councilman in believing the organism a protozoan. He warmly congratulated Professor Councilman and his associates for their investigations and discoveries, and specially noted the advantages of the discoveries in aiding the early diagnosis of the disease. If the organism can be found in the epithelial cells or the blood instead of our having to wait fourteen days for the eruption to appear, valuable time would be saved and the possibilities as regards treatment are evident. The organism belongs to the class of microsporidia.

*The Red-light treatment of Smallpox.*—Professor Niles R. Finsen, Director of the Finsen Light Institute of Copenhagen, in an article in the *British Medical Journal* under date June 6 last, asks the question: 'Is the treatment of smallpox patients in broad daylight justifiable?' He says: 'Ten years have elapsed since I first advocated red light in the treatment of smallpox. During my investigations on the effect of various rays of light my attention was directed to some old reports, especially American and English, on the injurious influence of light in smallpox, which coincided with my own observations as to the effect of light upon the skin. Knowing full well, if this were so, that the injury was due to the chemical rays of light, I recommended that the patients be protected against these rays by placing them in red light, exactly in the same way that photographers protect their plates from the chemical rays. In the course of years this treatment was tried in many places, meeting everywhere with unquestionable success. At the present time about twenty physicians in various countries, mostly, however, in Scandinavia, have given this treatment a trial, and all of them have obtained most favourable results when the treatment has been properly conducted.

'From numerous trials, together with various simultaneous controlling experiments, it may be considered as an irrefutable fact *that daylight and especially the chemical rays have a most injurious effect on the course of smallpox, as the suppuration of the vesicles is due to the effect of light;* and that, accordingly, it is possible to avoid the suppuration and its consequences by protecting the patients from the action of light. On the other hand, light seems to have no action on the smallpox infection itself, and death caused by the latter cannot be prevented by excluding the chemical rays. But even the avoidance of suppuration is in itself of the greatest importance, for it is a well known fact that the suppuration stage is the most dangerous of the various stages of smallpox. Moreover, it may be stated that the greatest number of deaths are due to suppuration, which, cœteris paribus, would be prevented if no suppuration were present. Further, the numerous complications and sequelæ due to suppuration may be avoided, as well as the disfiguring pitting, which is no small consideration. Smallpox is one of the most terrible diseases known, but the appalling feature which makes it so much dreaded is mainly due to the suppuration and its consequent sequelæ. When after the teaching we have received one hears for the first time that suppuration is due to light, especially to the blue, violet, and ultra-violet rays, and may with certainty be avoided if these rays are kept off, one is naturally somewhat sceptical. When it is demonstrated, however, that this observation rests on a *fact established by practical experience, which fully agrees with scientific theoretical investigations,* this scepticism must gradually give way to what is both rational and scientific.

'The action of light on the course of smallpox is astonishing, and the effect of the red-light treatment is one of the most striking results known in medicine. Even in cases of confluent smallpox or in unvaccinated persons the method very rarely fails, supposing, of course, that the patient comes under treatment early enough. If suppuration has begun or is on the point of beginning the red-light treatment will not stop it.

'After all, what we are dealing with here is not, properly speaking, medical *treatment;* it is more a preventive measure against the injurious effect of light. In the case of a disease where it is open to the patient to choose his doctor it may be said that he has himself to blame if he chooses a physician who does not know how to protect him from the dangers that threaten him. But when the disease *in question is one in which the public health authorities oblige the patient to go into a particular hospital, he has a right to ask that he shall not there be unnecessarily exposed to dangers that may be fatal or at least are liable to disfigure him for life.*

'It seems to me expedient to present the subject from this standpoint. From the foregoing I believe that the question put as the title of this paper must be answered peremptorily in the negative. Furthermore, from a modern scientific point of view, *it must be considered absolutely unwarrantable on the part of the public health authorities to treat serious cases of smallpox, in which suppuration might be expected, in hospitals where patients are exposed to daylight.* As to the private physician it must be considered *a gross shortcoming if, as soon as he diagnoses smallpox, he does not make preparations to prevent the patient from being exposed to daylight.* It is a most simple measure, which may be carried out everywhere, for everywhere it is possible to darken the windows, hanging up something before them. A candle will supply all the necessary light. The incompetency shown by the physician who allows the patient to lie in daylight is no less stupendous than if he neglected the ordinary aseptic measures in performing a capital operation.'

On the other hand, Jay F. Schamberg (*Journ. Amer. Med. Assoc.,* May 2, 1903) examines the claims made on behalf of the red-light treatment of smallpox. After a critical summary of the literature (Finsen, Lindholm and Svendsen, Feilberg, Strangaard, Benckert, Mygind, Abel and others) he states that during the winter of 1902 William M. Welch, physician in charge of the Philadelphia Municipal Hospital for Contagious and Infectious Diseases, and himself fitted up a room for the red-light treatment of smallpox. Although their experience was limited to two cases, the results were such as to destroy any confidence in the method they might have possessed. Their red room was complete in it appointments. The window panes were of a ruby-red colour, the gas-jet at night was surrounded by a red globe, the walls of the room were painted deep red, and a red curtain covered the inner of the two doors so as to completely exclude the light of day. Two unvaccinated young men (one 16 years of age and the other 20), who started with profuse eruptions, were placed in this room about the third day of the eruption, before the lesions had become frankly vesicular. The course which the disease pursued in both cases was in no wise different from that seen in patients treated in the regular wards. The pustules filled up and became confluent, the secondary fever was high and protracted, and the patients markedly delirious. One of the young men, who was a private case, and had a special nurse day and night with every possible attention, succumbed to the disease. The other recovered, but with most disfiguring scars. Owing to the discouraging results obtained in these two cases this method of treatment was abandoned. Schamberg goes on to say that it might be urged with apparent justice that an experience with two cases should not be counted as an offset to the results of treatment in 150 cases. He points out, however, that it must be remembered that the method failed absolutely to exercise any modifying influence on the disease in these two cases under appropriate conditions. Of the 150 cases, nearly all of which did well, other factors might account for the good result. Practitioners differed as to what constituted severity in smallpox. Several photographs of patients treated with red light, who recovered with no scarring or only insignificant scars, published in Finsen's book, represented what in the United States would be regarded as mild and favourable cases, the eruption being on the skin rather than in it. It must, says Schamberg, be remembered that Denmark, Sweden, and Norway are, with the exception of Germany, the best vaccinated countries of Europe. It is illogical and misleading to attribute favourable results to certain measures employed in the treatment of smallpox in persons once vaccinated. The vast majority of such patients recover without scarring under any treatment and even without any treatment. Again, in the absence of severe epidemics—and there have been no severe epidemics in the past decade—young children with variola (who are, of course, unvaccinated) usually escape without permanent scarring. The character of the prevailing form of smallpox, whether mild or severe, is a matter of great importance in determining both mortality and disfigurement. During the year ending June 30, 1902, there were in the United States 55,857 cases of smallpox with 1,852 deaths (a mortality rate of 3·31 per cent), and in the year previous 38,506 cases and 689 deaths (a mortality rate of 1·79 per cent). What would the verdict have been if red light had been used in these cases ?

It is possible that the failure thus noted by Schamberg in his two trial cases may have been due to the nature of his glass of a ruby-red colour. It is well known to photographers that some red glasses fail to quite prevent the passage of the actinic rays. Vogel, of Berlin, in his Practical Pocket-Book of Photography, says: 'The selection of the ruby glass is very important. What is called red copper-glass is employed ; red gold-glass is useless. A good ruby screen will only transmit red light, and can be tested in this by a spectroscopic examination. Unfortunately, most screens do not satisfy these conditions, but allow a considerable amount of blue and green light to pass as well as red. If you have no spectroscope you can satisfy yourself whether it transmits pernicious light by exposing a dry plate, half covered with black paper, at the distance of half a yard for half a minute, and then develop it. If pernicious light has been transmitted, the exposed end darkens in the developer.' And Abney, in his work on Photography, says: 'Ruby glass alone is not a sufficient protection, since blue light is apt to permeate it. The safest plan, perhaps, is to glaze the window with stained red glass, and then to have a curtain over it of an orange colour.'

*Chloroform in the preparation of Vaccine.*—Dr. Alan Greene, in a report to the Local Government Board, published this year, on the germicidal action of various substances on the micro-organisms, specific and extraneous, of vaccine lymph, affords strong presumption that we are likely to obtain in chloroform, as applied by the methods devised by him, an agency not only more potent but infinitely more speedy than glycerine in eliminating from our vaccine lymph undesirable micro-organisms.

An account of the first experiments made by him on this subject appeared in a paper published in the report of the medical officer to the Local Government Board, 1900-1901. The present paper deals with the continuation of those experiments.

'The object throughout has been to ascertain, as far as possible, the relative resistances of the specific and the extraneous micro-organisms contained in freshly collected vaccine to various chemical substances, and to compare such resistances with the resistance of similar germs to glycerine.

'As mentioned in my former paper, the results of the action of glycerine on vaccine material are fairly well defined. Generally speaking, its action is germicidal to the non-sporing adventitious bacteria of crude vaccine in from 4—8 weeks, the specific organism remaining meanwhile resistant to this destructive action, and continuing potent for considerable periods of time. As in the case of the specific organism, spore-bearing organisms also show considerable powers of resistance. These spore-bearing organisms, which occur occasionally in vaccine, are practically confined to the mesenteric group of bacteria. Indeed, in the thousands of vaccines examined at these laboratories no other variety of spore-bearing bacteria has been found.

'While much investigation has been made of the action of glycerine on vaccine, apparently little is known concerning the action on vaccicne of other chemical substances, and glycerine appears to be, at the present time, the only agent in vogue for the "purification" of vaccine. That this property was not peculiar to glycerine, but was possessed by other substances, was shown last year in the paper already referred to.'

Owing to the rapid manner in which, in the first experiments in 1900 and 1901, chloroform in saturated watery solution was found to kill the extraneous organisms of vaccine, while the specific germ of vaccine retained its potency apparently unimpaired, further experiments have been made during the past year of mixing vaccines with this substance. They consist of four series of experiments.

So far the following points have been demonstrated:—

1. Pure chloroform, whether used alone, in excess in chloroform water, or in excess in a 50 per cent solution of chloroform water and glycerine, is rapidly destructive to the extraneous bacteria of vaccine, with the exception of the spore-bearing organism *bacillus mesentericus,* and rapidly causes the potency of the specific germ to be destroyed.

2. Chloroform water, or a solution of 50 per cent glycerine and chloroform water, is destructive to the extraneous bacteria of vaccine, with the exception of *bacillus mesentericus,* in about six hours, while it has left the vaccine specific germ potent for as long as eight months. In the control vaccine, prepared with a 50 per cent solution of glycerine and water, elimination of extraneous bacteria rarely took less than, and was not often not complete in, seven weeks. Here also *bacillus mesentericus* proved resistant to the germicidal influence. In no case did a control vaccine give rise to better vesicles than the vesicles originating from an experimental vaccine.

Other points have been touched on in these experiments, but further work is needed in order to draw definite conclusions with regard to them. One of these points is the desirability of using or omitting glycerine in the preparation of chloroform vaccine. So far, although several such vaccines have been mixed, with and without the presence of glycerine, it has not been practicable to do more than draw conclusions as to the relative germicidal values of the two methods, and these values are apparently equal. Where glycerine has been used in addition to chloroform water the advantages have been solely due to the increased viscidity and specific gravity of the mixed vaccines, which have thus been easier of manipulation; that is to say, the uses of glycerine so far in this connection have been strictly those of an 'emulsifying' medium, and the uses of chloroform have been strictly those of a very rapidly acting 'selective' germicide. Further experiments are needed to determine the relative keeping properties of chloroform vaccine, with or without the presence of glycerine. So far, all that is definitely known is that both these kinds of vaccine will retain their potency for several months. It would seem probable from analogy that vaccine mixed with any germicidal substance must suffer in some degree loss of potency; and possibly it will be found that combination of chloroform water and glycerine may prove more detrimental to prolonged activity than the action of chloroform water alone continued for only such time as is necessary for the elimination of the extraneous micro-organisms.

And he adds: 'Quite lately I have devised another method of treating vaccines with chloroform which so far has given very satisfactory results. Roughly, this method consists of passing a mixture of *chloroform vapour* and air through vaccines previously mixed either with distilled water or with distilled water and glycerine solution. In this way elimination of extraneous micro-organisms is found to be as complete, and in point of time more rapid, than by former chloroform methods, while the specific germ remains fully active.'

The potency of some vaccines, glycerinated or otherwise, becomes greatly impaired within a few weeks of collection—that is, within the time required for glycerine to exert fully its influence in eliminating extraneous organisms. Some of these vaccines may, at the time of their collection, have possessed a high vaccination value. Vaccine, characterized by this high but somewhat transient potency, can by means of the chloroform process be used at once before its activity has deteriorated, thus allowing greater economy of vaccine material than would otherwise be possible. For a similar reason the chloroform process might be of considerable use in hot climates, where the preservation of the potency of vaccine is frequently a matter of considerable difficulty.

*Glycerine in the preparation of Vaccine.*—Dr. Rosenau, Director of the Hygienic Laboratory of the United States Public Health and Marine Hospital Service, in a bulletin dated last month, writes as follows:—

'This study was undertaken and is published on account of its importance from a public health standpoint, particularly in view of the fact that glycerine is used to conserve vaccine virus and analogous products. On account of its bland and non-poisonous properties glycerine has long been used as a preservative for organic matter; but not until 1891, when Copeman claimed for it special virtues as a germicide, did it come into general use to purify vaccine virus.

'A false sense of security arose over the overestimate of the antiseptic and germicidal value of glycerine. This fact we have brought out in previous publications on the subject of the bacteriological impurities of vaccine virus. Other substances, such as chloroform vapour, chloretone, potassium cyanide, carbolic acid, formalin, &c., have since been used as a substitute for glycerine with more or less success, and it is possible that one of these more energetic germicidal substances may be found to be superior to glycerine for this particular purpose in commercial practice.

'In brief, it may be stated that glycerine has distinct but very feeble germicidal and antiseptic properties. The results are summarized as follows:—

'Small quantities of glycerine, less than 10 per cent, added to nutrient media have well known powers of favouring the growth and multiplication of many forms of bacteria.

'The presence of 50 per cent of glycerine will restrain all bacterial growth. Less than this amount can not be depended upon for the preservation of vaccines and other organic growths.

'The antiseptic power varies for the different glycerines. For instance, some restrain all growth and development when present in the proportion of 43 per cent; others require 49 per cent.

'No evident growth of multiplication of bacteria takes place in nutrient media containing 32 per cent of glycerine, but moulds grow in stronger percentages, viz., 40 to 49 per cent.

'In order to prevent the growth and development of pus cocci at least 33 per cent of glycerine must be present. This is more than that required to restrain the growth and multiplication of the other eighteen different pathogenic and saprophytic bacteria tested.'

*Trinidad* was visited by an epidemic eruptive disease last winter and spring. Dr. R. Scheult, the health officer of Port of Spain, wrote to me in March and April last, detailing the symptoms and inclosing photographs. From his letters I had no hesitation, in answer to his request, in saying that in my opinion the disease was smallpox. It is, however, of that same mild type which has prevailed in the United States and Canada for the last few years, and which I have described under the suggested title of *Variola Ambulans*. Photographs of actual cases in Trinidad, and of some in the North-west Territories of this country, suffice to show the strong resemblance.

*Leprosy.*—Dr. Jonathan T. McDonald, pathologist to the Hawaiian Territorial Board of Health, gives the following as a brief summary of a diagnostic examination of one hundred and fifty cases of leprosy:—

1. The microscope is the supreme agent of the final diagnosis of leprosy. No patient should be committed to a segregated colony without a bacteriologic demonstration of the disease.

2. Of clinical symptoms, maculæ, chiefly leucodermic spots are found in 89 per cent of all cases.

3. The lepra nodule found in 74 per cent is the one chief distinguishing lesion of skin leprosy.

4. Thinning or complete loss of eyebrows and lashes is present in 63 per cent.

5. Atrophic changes in hands and forearms with retraction and contraction of fingers and enlarged ulnar nerve in 32 per cent a leading feature of nerve leprosy.

6. The planter ulcer found in 26 per cent, usually on the ball of the foot.

7. Absorption of phalanges in 16 per cent, with occasional spontaneous amputation.

8. Elephantiasis of hands and feet in 16 per cent.

9. Facial paralysis in 11 per cent.

10. The entire body should be carefully tested for anæsthetic areas.

11. Several of the above symptoms can be found in some slight degree at least in every leprous subject.

Jonathan Hutchinson, F.R.S., has returned to England after a tour of investigation in India as to the cause and prevention of leprosy, especially in reference to the hypothesis which assigns the foremost position among the causes of the disease to the use of unwholesome food.

Twelve years ago the Prince of Wales' committee, which was sent to India, rejected this hypothesis, but Dr. Hutchinson's latest investigations have convinced him that the committee, if it had pursued its researches more deeply, would not have rejected it. Dr. Hutchinson's general conclusion is that the facts do not controvert the hypothesis, while some of them afford unassailable support of it, of the truth of which his inquiries in South Africa last year convinced him.

Dr. Hutchinson's tour of India included visits to Colombo, Madras, Lahore, Calcutta and Bombay, where he held public meetings and discussions, and also visits to the leper asylums at Colombo, Madras, Calcutta, Purula, Asonsal, Agra, Tarntaran, Jullundur and Bombay.

He visited in Ceylon all the lepers who had been fish eaters. In Madras and Calcutta each of the lepers, with the single exception of a high-class Brahmin, denied that they had ever eaten fish. In Bombay there was one doubtful exception. In Agra, Tarntaran and Jullundur there were several exceptions. Of the 500 inmates of the Purula asylum, all had habitually eaten of fish, and many believed that this had caused the disease. Some had left off eating it on that account. The majority of those who had not eaten fish were patients who had contracted the disease in early life.

In accounting for these, Dr. Hutchinson suggests 'commensal communication' spreads the disease to a slight extent in a community where it has once originated, without it becoming contagious in the ordinary sense of the word. Commensal, or mouth communication, conveyed the disease by eating food directly from the hands of a leper, or otherwise received the bacillus by the mouth.

The prevalence of the disease in the whole population of India is not greater than 5 in 10,000, which is about the same percentage as in Norway, but not a single district is entirely free from the disease. It is always more prevalent in or near the fishing places. In Ceylon, where the fisheries are so unproductive that the greater portion of the fish consumed must be imported, the incidence of leprosy is less than two per 10,000. In Minicoy, the adjacent fish-exporting island, where the inhabitants eat fish four times a day, the percentage is 150 in 10,000. In the Bombay asylum there are 400 inmates, the majority of whom are from the great fishing district of Konkan. During eight years there have been no Jains, and only one Parsee patient. The Jains are strict vegetarians.

Mr. Hutchinson said that he was much struck in the report of an asylum near Bombay concerning a column in the report headed Salsette Christians. The number of lepers under that heading was more than under the heading of Hindus or Mohammedans. Salsette Christians simply meant Roman Catholic Christians living in the island of Salsette. The patients from the Salsette Christians in the asylum were very much out of proportion to their ratio to the population. If it were supposed that Jain and Hindu, and Mussulman and native Christian were all equally exposed to the risk of leprosy, the Hindus ought to have furnished 1,419 patients to that asylum, but they really furnished 365; the Mussulmans ought to have furnished 372, they really did furnish 45; the Christians ought to have furnished 9, they furnished 60. Similar tables from other asylums showed the same sort of thing. The Salsette Christians were fishermen, and Mr. Hutchinson considered that there was no other conclusion than that the change to Christian food by the poorer classes of India, and most especially to that enjoined by Roman Catholicism, was most powerfully productive of leprosy. Amongst the facts as to leprosy which were generally acknowledged might be noted: Its world-wide distribution; its great antiquity; its marked preference for certain localities; its sameness in all regions and in all races; its very scattered and scanty occurrence in many large districts which yet never became free from it; the absence of any evidence of contagion in connection with leper asylums; the assertion by a large majority of the patients that they had never knowingly been exposed to any risk of contagion; it was remarkably persistent in certain localities; the proof of it being transmitted hereditarily was for the most part negative; in no region where it had been long established did it ever in any locality assume epidemic prevalence; it was prone to die out and leave large communities amongst whom it had been prevalent entirely free; in all declared cases it had a bacillus which resembled closely that of tuberculosis; experiments in inoculation had always failed; no primary sore or patch was ever identified on the surface; it might have almost indefinite periods of latency or incubation; in almost all countries and in all ages in which leprosy had prevailed there had been more or less a popular belief that it had been caused by fish eating; when two communities living in close proximity, the one addicted to hunting, the other to fishing, it was the latter that might suffer severely and the former that might wholly escape; and it had been wholly or almost wholly absent from Cape Colony, from Natal, from the Sandwich Islands, and from some other places until factories for the salting of fish were instituted.

Mr. Hutchinson, contrary to general expectation, as a result of his visit to India, has not only retained his long-held beliefs concerning fish and leprosy, but actually seems to have strengthened them. He strongly asserts that the consumption of putrid or tainted fish is the cause of the leprosy which exists in India, and he has appealed to the government to take the tax off salt, so that the natives may be able to cure the fish which they wish to use as food.

Dr. T. J. Tonkin, medical officer of the Hansa Association's Central Soudan Expedition, writes in the August and September numbers of the *Empire Review* of his experience among the lepers in that part of the Soudan known as Northern Nigeria. Leprosy is extremely prevalent there—more so, perhaps, than in any other locality of a like size in the world—so that the writer who spent a considerable time among the Nigerian lepers, is able to give valuable information as to their habits and mode of life, and his views with regard to the disease are worthy of close attention.

His opinions respecting the contagiousness of leprosy are in accord with those of Hansen and many other prominent authorities, but he combats the popular notion that the disease is incurable. With respect to this point he says: 'Leprosy is supposed to be incurable. Incurable it certainly is, in the sense that at present we are not in possession of any remedy that affects its course as definitely as, say quinine affects that of malarial fever, and iodide of potassium another more common than reputable disorder. It is not incurable in any other sense, however. Recoveries from the disease are by no means of infrequent occurrence. As a matter of fact, it is a rare thing to hear of the actual morbid processes covering a period of more than twenty years. If the patient has survived so long it will often be found that all specific leprous manifestations have disappeared.

The influence of heredity on the spread of leprosy, Dr. Tonkin thinks, is another popular fallacy. He states that, in point of fact, direct heredity has nothing whatever to do with the spread of leprosy, and that his Nigerian results bear directly on this point. Of all the lepers examined by him in the Soudan, only 10 per cent had any leprous taint in their ancestry, leaving 90 per cent that must have derived their disease or their tendencies from other sources. Moreover, among the children of leper parents, a percentage of less than ten developed the disorder.

The writer regards defective diet as playing an important part in the development of leprosy. But he holds that leprosy is a contagious and infectious disease, and in the Soudan is spread from person to person mainly by the agency of infected clothes. He maintains that segregation is an effectual means of checking the advance of the disease and of finally stamping it out. This method is, unfortunately, impracticable in the Soudan, China or India, but much the same cycle of changes may be anticipated in these countries as took place in England and in other lands where leprosy was once rife, but where it is now extinct. As civilization progresses and as the countries in which leprosy is now prevalent come under the sway of western nations, sanitary methods and a higher manner of living will, in Dr. Tonkin's opinion, drive out the disease.

Dr. Isidore Dyer, Professor on Diseases of the Skin, New Orleans Polyclinic, and Consulting Leprologist to the Louisiana Leper Home, writes as follows, as to the communicability of leprosy, in a paper read at the session this year of the section on hygiene of the American Medical Association:—

'Notwithstanding the fact that the lepra bacillus is found in all cases of leprosy in which there are evident lesions of the disease, that the bacillus is frequently in the nasal secretions, that it has been found in the earth from the graves of lepers, that it has been found in the rooms where lepers lived, that it has been found on utensils used by them, there are those who contend that the disease is not contagious. Their argument is based on the fact that Koch's law is not fulfilled, i.e., that the disease is not propagated in animals nor in other subjects, who, inoculated in turn, transfer it to others. I believe we can dismiss these antagonists because of their purely technical position in the face of other circumstantial and positive evidences. To wit: Leprosy spreads in any community in which it is introduced; it spares neither old nor young; it may be selective of race, but it occurs almost directly in close community life; it occurs in families, and has not been proven hereditary; it frequently attacks the children before the parents; there is almost always a history of exposure, either direct or indirect, and, if sought for, communication of the disease from person to person may be traced.

'Opinion to-day classifies the degree of contagiousness in leprosy. Formerly it was believed that contact with the unbroken skin of a leper would produce the disease. Popular fear created the impression that looking at a leper, being in his presence, was sufficient; to-day, the consensus of opinion carries the belief that the nasal and buccal secretions, together with those of the generative apparatus, are the most frequent sources of the spread of the disease. This is borne out by the fact that the tubercular types of leprosy nearly always show the first signs on the exposed parts of the body, face and hands, and that early in the disease the nasopharynx presents tubercles.'

He gives a historical summary of the spread of the disease, and has the following to offer concerning its prevention: First, as to the individual, either the patient should be segregated with those of like condition, or else, if he lives in his own family, he should be given a separate room; should have his meals alone; should wash his own utensils and should have his laundry boiled separately. The author believes that this is difficult, because, even when the family are aware of the disease they become careless in the family relations. Second, as to the public. The proper public care of lepers provides (*a*) segregation under systematic methods which should consider (1) the segregation of the sexes; (2) some arrangement by which the trophic or nerve type should be entirely separate from the tubercle type or skin leprosy, because there is no reason why a leper with nerve leprosy should not acquire fresh lesions from infection by a new contagium carrying the leper bacilli, found so freely in the tubercle type. Heretofore leprosy has been held as incurable, and the simple diagnosis of leprosy has been sufficient to condemn a victim, irrespective of the type, and he is doubly condemned if he is exposed to fresh infection while he is trying to get well. (*b*) Particular methods of sanitation should obtain. No institution pretending to care for lepers should be without the fullest equipment for bathing facilities, both medical and plain. Water in leprosy is as potent in its prophylaxis as it is for remedial use.

In connection with Hutchinson's belief that leprosy may be due to the eating of badly cured or tainted fish, it is of interest to note that Dr. Smith reports that he has been informed by some of the older people of Tracadie that in former days, and even as recently as thirty years ago, the inhabitants living along those shores, would not eat fresh or well-cured fish, but laid it aside until tainted. 'They wished to have some taste to it.'

*Beri-beri.*—Dr. Ashmead, late foreign medical director, Tokio Hospital, Japan, writes as follows to the New York *Herald* under date of August 27 last, concerning the etiology of this disease:—

'I beg to observe, relative to your news item in the *Herald* referring to the arrival of the barque *Wilkstrom, Jr.*, at Port of Spain, Trinidad, from the Brahmapootra, near Bengal, whose inhabitants are nearly all meat eaters, Mohammedans, with her crew dead or dying from beri-beri, and with a cargo of 16,000 bags of rice, that the cargo might have become wet and fermented enough to generate carbonic acid gases.

'I have investigated a great number of outbreaks of beri-beri which occurred on ships arriving at this port, and in every one of them I found there had been such generation—ships loaded with raw, low grade sugars from the East and West Indies and Brazil; with coffee, picked too green in Java, which had charred in the voyage; graphite (pure carbon), mined in Colombo, Ceylon; green hemp, from Iloilo, and last, a cargo of phosphatic earth, with seventy-five negro passengers, from Navassa Island, West Indies, who had been crowded and hatched down in a small cabin for thirteen days and nights without ventilation, and with four lamps burning from the confined area what little oxygen was at their disposal.

Besides this almost conclusive evidence that beri-beri is due to carbonic acid gases, and not to insufficient alimentation (the red corpuscles of the blood are never deficient in beri-beri), nor to germs contained in white rice of Saigon or anywhere else (I found beri-beri outbreak on a ship where beans and no rice at all were eaten during the entire voyage), there is the further fact that I found carbon in the blood of beri-beri which I analyzed. The hæmogoblin deficiency of beri-beri is in exact ratio with the artificial poisoning by carbon, it being converted by the chemical into methemoglobin.

'The Sei-y-Kwai Medical Journal, of Tokio, Japan, will soon publish an article of mine relative to analysis of beri-beri blood to find carbon. Moreover, Professor Miura, of Japan, found a case of beri-beri in a scientist who was shut up in December on the top of Mount Fuji with the crevices of his hut sealed to keep out the cold north winds.

'Fujiyama is 12,600 feet high. This scientist had relied on the charcoal stove of Japan to keep himself from freezing to death. As it was, his fingers and toes were badly frozen. Now, if beri-beri was due to a germ in rice diet on the top of Mount Fuji in the month of December in Japan why does not beri-beri occur in the same month at sea level in Japan? It never does, for as soon as the southwest monsoons stop blowing and the cool north winds come in all beri-beri disappears. There is no beri-beri in winter time in Japan. It only occurs during the rainy season, June, July and August, when the air is so wet that water can be wrung from your clothing and everything is covered with green mould.

'To solve the question of etiology of beri-beri a cause must be found which will apply to every beri-beri centre. The rice alimentary theory does not, nor does the rice germ theory, for I found beri-beri on American whaling ships in a crew where the diet was not rice, nor had the ship or crew ever touched at a beri-beri port.'

Dr. Ellis, Medical Superintendent of the Government Asylum, Singapore, is not a believer in rice as a causative factor in this disease. He writes to the *British Medical Journal* as follows:—

'In this asylum beri-beri has been endemic since shortly after its opening in 1887, the deaths from the disease averaging 45 per annum, and the number of cases treated about 150 per annum for the five years ending 1900 out of an average daily number of 207. Since that date the disease has been nearly stamped out. Our numbers having considerably fallen, it has been possible to move the patients at every few days' interval from one part of the asylum to another, thoroughly cleaning and disinfecting up behind as we move; more attention has been paid to the disinfection of clothes, bedding, furniture, single rooms, &c., and the ventilation and drainage have been recently improved. Above all, three years ago, two small wards were constructed on the sea beach four miles from town, and here all cases have been sent upon showing the slightest symptoms of beri-beri. These wards are washed out, walls included, in sea water, and then in a solution of mercury perchloride weekly. All woodwork is frequently whitewashed or tarred. The bed boards are soaked in sea water and dried in the sun twice a week. All clothing, bedding included, is changed and disinfected twice a week. The whole compound, consisting of sand, is raked over weekly, and thus thoroughly exposed to the rays of the sun, and from time to time the surface sand is collected and put on the beach below high water mark for a tide and then returned. All patients are bathed for at least half an hour daily, and are kept in the open during the whole day. Massage is used in all cases. The administration of strychnine, digitalis, iron, and very free purgation is the common medical treatment. To these precautions our present immunity from the disease—12 cases to date for the year and but 5 deaths in the last two years—is, in my opinion, due. One of these 5 deaths occurred in the seaside hospital, the other 4 patients were too maniacal to be sent there for treatment. Our patients, I may add, are all fed on Siamese rice.

'Thirteen years ago I separated twenty healthy native patients on admission in two cottage blocks, giving them European food and no rice whatever. At that time beri-beri was very prevalent among the natives—we have never had any cases in Europeans or Eurasians—and I wondered if in any way the food was in fault. My experiment had to be given up in less than three months, as more than half of the twenty cases had by then developed symptoms of the disease. The opinion I then came to was that beri-beri was a place disease, that the soil and buildings were infected, and that people dwelling there were liable to absorb the poison, whatever it was, that this poison absorbed in sufficient quantities was the cause of beri-beri, and this opinion I have never seen reason to change. From that date disinfection has lately been relied on to combat the disease, and I can only regret that the more thorough manner in which we now try to carry it out was not adopted earlier.

'An instructive instance of a small epidemic of beri-beri on shipboard came under my notice in 1900, entirely, I think, putting Siam rice out of the question as a cause of beri-beri. A well-found steamer carrying 28 Malay and 51 Chinese hands, sailed from Singapore for New Zealand and Australian ports. All were fed on Siam rice, cooked in the same manner and in one galley. When in cold weather near New Zealand, beri-beri broke out in the starboard forecastle inhabited by 14 of the Malays, and in all there were 8 cases and 5 deaths. This forecastle had the galley situated immediately aft, with but a thin wooden partition between. The heat from the galley caused the cabin to be always sweating and steamy, as it was somewhat wet from the bad weather experienced at the time; in fact converted it into a perfect incubation chamber. Such a condition has been noted many times as favourable to the spread of the disease. No food was taken to or consumed in the forecastle.

'I was consulted by wire as to any precautionary steps that could be taken, and recommended the erection of shelters on deck to accommodate the hands occupying the forecastle, the thorough disinfection of the ship, paying special attention to the starboard forecastle, which should not be used for habitation during the remainder of the voyage, and some ordinary medicinal treatment. On the ship's arrival at Melbourne the 3 sick were sent to hospital, where they recovered; 5 had died, and no further case had occurred, nor did one. Had the rice been in fault it is difficult to understand why the 8 cases occurring should have all been among 14 men occupying one cabin, and that the remaining 65 hands should have entirely escaped.'

*Immunzation to the Baccilus Typhosus.*—The *Medical Record* thus states the present position of this question:—

'The efforts which have been put forth of late to produce a reliable anti-typhoid serum cannot be said to have been crowned with success. There is no agreement as to the efficacy of Professor Wright's method of anti-typhoid inoculation, although the weight of evidence would appear to warrant the belief that this mode of protection against an attack of typhoid fever is not to be depended upon. With regard to the surpassing importance of discovering some prophylactic agent which would prevent —if only to a limited extent—the prevalence of this disease, there is no need to insist. In time of war the death rate would be immensely decreased if it were not for the occurence of typhoid fever. In almost every war which has taken place within the past fifty years this malady has been the cause of the greatest mortality.

Dr. W. Vernon Shaw, Wellcome Physiological Research Laboratories, writing in the *Lancet*, October 3, points out that in the case of tylpoid fever it is especially difficult to produce an effective anti-serum, for the reasons that the organism is attacked as a whole, though the brunt of the attack falls on the tissues first invaded—i.e., the lymph follicles of the intestine, and further the reactions of the organism invaded by the bacillus typhosus are not well defined.

'Another practical difficulty in the production of active immunity to the typhoid bacillus is the separation or production of a soluble toxin. Rowland and MacFayden claim to have proved the presence of intercellular toxins in the bacillus typhosus. Their method was to grind up agar cultures of the bacillus, and so obtain a soluble toxin. With this view Professor Welsh agrees. Mallory goes further, and is of the opinion that the proliferation of the lymphoid tissues of the intestine, the mesenteric glands, and the spleen pulp is caused by the specific action of the typhoid toxin. Welsh —according to Dr. Shaw—is in accord with this idea, and thinks that the proliferation of these cells is partly compensatory and partly defensive.

'Dr. Shaw's experiments were undertaken to show: (1) the virulence of the particular bacillus used; (2) the effect of normal horse plasma on bouillon cultures; (3) the immunization of a horse to the bacillus typhosus; (4) the value of the serum from such a horse; (5) the bactericidal power of normal blood compared with that from an immunized horse on the bacillus typhosus.

'The conclusions reached as the result of these experiments were as follows: (1) The best method of obtaining a toxin is by the digestion of the bacilli. (2) This product is toxic. (3) This product can excite a reaction in susceptible animals, during which they develop immunity to the injection of living typhoid bacilli, and the serum from such an animal can protect another animal against typhoid infection. (4) The injection intravenously of living typhoid bacilli may result in the production of a "negative" phase of resistance.'

*Tuberculosis.*—The observations and experiments during the year all tend to confirm the belief that the human tubercle bacillus and that of the domestic animals are identical, but modified somewhat by their environment. Amongst others whose experiments this year support this view may be mentioned Hamilton and Young of Aberdeen, Gratia of Cureghem, Von Behring, McFadyen, Ravenel, Salmon, Kober and Kossel.

Hamilton and Young submit the following conclusions:—

We hold that our experiments prove—

1. That, although human tubercle is probably not so virulent for the calf as that derived from bovines, yet it can be readily inoculated upon that animal.

2. That this holds good whether the tubercle inoculated be derived from tubercular lymph-glands, tubercular lung, tubercular sputum or tubercular urine.

3. That it produces this positive result irrespective of whether it be introduced by feeeding the animal with the tubercular material, by subcutaneous inoculation upon a peripheral part, by respiring a spray containing the bacillus, or by injection into the venous system.

4. That the organs most affected are those in immediate connection with the part operated upon.

5. That the lymphatic system is constantly involved in the resulting tuberculosis.

6. That when administered by the mouth, tubercular sputum induces an abdominal lymph gland tuberculosis without necessarily the intestine being any way involved.

7. That when tuberculosis from a human source has been ingrafted upon a calf, it gains enormously in virulence by being reinoculated upon a second calf.

8. That the morphological characters of the bacillus may vary according to circumstances, and are no guide to the source of the organism under observation.

9. That the above facts go to favour the view that the human bacillus and that of bovines are identical, but modified somewhat by their environment.

10. That our results are a direct contradiction of those alleged to have been obtained by Koch and Schütz.

Salmon, in an address on bovine and human tuberculosis, says:—

'In the Bureau of Animal History two distinct lines of experiments have been carried on, in order than one might be checked up against the other. De Schweinitz, in the Biochemic division, has isolated nine cultures from human tuberculosis. Two of these were derived from human sputum, three from cases of generalized tuberculosis in adults, and four from cases of generalized tuberculosis in children. These cultures were compared with a newly isolated virulent culture of bovine tuberculosis, and among them two of the cultures from children were found to be identical in their cultural and morphological characters with the bovine bacillus. They also killed rabbits and guinea pigs in as short a time as did the bovine bacillus. Hogs inoculated subcutaneously with these two cultures from children died of generalized tuberculosis. Two calves, weighing over 300 pounds each, developed a generalized tuberculosis after a subcutaneous inoculation with these virulent human cultures, and a yearling heifer inoculated with one of them showed generalized tuberculosis when killed three months after inoculation. Both the cattle and the hogs had been tested with tuberculin and found to be free from tuberculosis before the inoculations were made. It will be observed that 50 per cent of the cultures obtained from children were virulent for cattle.

'Mohler, working in the Pathological division, has obtained three very virulent tubercle bacilli from the human subject. A goat inoculated subcutaneously with a culture of one of these died in 37 days with miliary tuberculosis of the lungs involving the axillary and prescapular glands. This bacillus was obtained from the mesenteric gland of a boy. Of still greater interest is a bacillus isolated by Mohler from human sputum. A goat inoculated subcutaneously with a culture of this germ died in 95 days of pulmonary tuberculosis. A cat inoculated in the same manner died in 23 days of generalized tuberculosis. A rabbit similarly inoculated died in 59 days of pulmonary tuberculosis. A rabbit inoculated with a bovine germ for comparison lived 10 days longer than the one inoculated with this sputum germ.

'It is plain from these experiments that there is a great difference in the virulence of tubercle bacilli from human sources, and that while some of these are not capable of producing serious disease in cattle, sheep, goats and swine, there are others which produce generalized lesions and are very fatal with such animals.

'You will observe that de Schweinitz has isolated tubercle bacilli from human lesions which when cultivated in the laboratory are of the bovine type, and that he has produced fatal disease in bovine animals by inoculating them subcutaneously with cultures of these bacilli. That is, he has fulfilled the most difficult requirements as to experimental work which those who oppose the theory of the transmission of bovine tuberculosis to man have been able to formulate. The results of these experiments make it necessary to admit either that human and bovine tuberculosis are identical, or that, being different, the bovine form is transmissible to man. There is no third theory by which the presence in human lesions of tubercle bacilli having the characteristics of the bovine type can be satisfactorily explained.'

And he closes by saying: 'Very recently (July, 1903) Kossel has given some of the results of the investigations of the German Tuberculosis Commission. This commission has studied and tested the virulence of 39 different fresh cultures of bacilli from human tuberculosis. Twenty-three of these cultures were from adults and 16 from children. Among the 16 cultures from children 4 were virulent for cattle. Two of these were cases of primary tuberculosis of the digestive organs, and two others were miliary tuberculosis. Kossel states that while these cultures were not as virulent as the most virulent cultures of the tuberculosis of animals, they were much more virulent than the weaker cultures of cattle tuberculosis. It is plain, therefore, that these cultures were of about the same virulence as the average bovine tuberculosis, and that this commission, working according to the principles laid down by Koch, has found 25 per cent of the cases of tuberculosis in children investigated by them to have been caused by infection with bovine tuberculosis. Whether this is a greater or smaller proportion than some have believed is of little consequence. The figures are definite, and to most of us it would be astounding if it should be found that they are of general application. The danger from bovine tuberculosis can no longer be doubted; and whether it is found that 25 per cent of the cases of tuberculosis in children, or a greater or smaller proportion, are due to infection from animal sources, it is plain that the proportion is sufficiently high to make the prevention of such infection a matter of the greatest importance.'

Dr. George M. Kober, in the *Journal of Medical Sciences,* October, brings forward a mass of evidence in support of the view that tuberculosis can be caused in a human being by means of the ingestion of milk from diseased cows.

The writer draws these conclusions: (1) Tuberculosis may be transmitted to man in milk from tuberculous cows. The danger from this source is real and cannot be measured by the actual number of recorded cases, but should be judged, in part at least, by the inoculation and feeding experiments, and the accidental wound infections which have established the intercommunicability of bovine and human tuberculosis. (2) The degree of danger may also be estimated by the prevalence of bovine tuberculosis and of forms other than phthisis pulmonalis in man, remembering that the infectious qualities of milk are greatest when the udder is the seat of lesions and that Gebhardt's experiments have shown that tuberculous milk when diluted with the milk of sound animals in the proportion of 1:40 lost its power. (3) The experimental studies also indicate that while the bacilli of human tuberculosis possess different degrees of pathogenic power and are often of feeble virulence for cattle, Koch's assumption that human and bovine tuberculosis are distinct and that human tuberculosis cannot be conveyed to cattle appears to be disproved, and his failure to secure similar results may be attributed to the use of human bacilli of diminished virulence. (4) Recent investigations have strengthened Smith's claim that there are two types of tubercle bacilli—the so-called bovine and human types—possessing certain morphological and biological differences; but it has also been shown that virulent cultures may be obtained from both of these types, which, when inoculated into animals, produce the disease in question. (5) Further research seems desirable with a view of determining the frequency of primary intestinal and abdominal tuberculosis in all cases which come to autopsy, whether the child perished from tuberculosis or not, and in these autopsies the bacteriological examination should be directed to the existence of the two types of tubercle bacilli originally referred to by Smith, and whether the bovine type predominates in the so-called scrofulous lesions. (6) Careful chemical analyses of the milk of tuberculous animals should be made with a view of determining the amount of phosphoric acid as compared with the quantity in normal milk, since it appears probable from Dr. de Schweinitz's bio-chemical researches that the excess noticed by the older chemists is really the results of bacterial activity in the udder of the cow. (7) In the meantime the pathologist has no reason to reverse his opinion as to the identity of human and bovine tuberculosis, and the sanitarian has no reason to assume that the human subject is immune against infection with the bovine bacillus, or is so slightly susceptible as to cause him to relax his efforts in preventive measures.

Dr. Marmorek, an Austrian bacteriologist, who was until recently the leading chemist at the Pasteur Institute, has communicated to the Academy of Science of Paris the results of his experiments in curing tuberculosis. His researches led him to discover a serum or vaccine which he believes is efficacious. He has used it for more than a year, obtaining favourable results in tuberculosis. Dr. Marmorek claims to have made several absolute cures, besides effecting distinct improvement in some advanced cases. He admits, however, that a definite verdict on the merits of the serum can be only obtained after experimentation on a greater scale than he has been able to practise.

*Congresses and Meetings.*—The Eleventh International Congress of Hygiene and Demography was held at Brussels, September 2 to 8, under the patronage of His Majesty the King of the Belgians.

An animated discussion on the subject of the relation of human and bovine tuberculosis took place, and the conclusion was arrived at that no precautions should be relaxed to safeguard human beings against any possible contagion. A resolution put by Sir Patrick Manson urging all governments to take steps to recognize the mosquito malarial theory, and to enforce its adoption, was carried. A discussion on the plague was held, and a resolution was passed that the conditions of quarantine against the disease should be improved.

The following desiderata were formulated in concluding the question of plague: In consideration of the fact that recent data incontestably prove the rôle of rats as agents in the propagation of pest aboard ship, even when there is no case of human pest aboard, and when the ship does not come direct from infected ports; and also in consideration of the security procured by preventive inoculations of antipest serum to crews and passengers brought in contact with the sick: Resolved, That the congress express the opinion that quarantine measures now applied be modified as follows:

1. The limitation, in the largest sense of liberalism, of isolation in lazarettoes and replacement, whenever the sanitary authorities judge it possible, by a simple observation of ten days at the port of arrival, this observation being reduced to five days for passengers who consent to submit to a preventive inoculation of antipest serum, even when these passengers come from a ship having cases aboard during the passage.

2. Limitation for vessels and cargo of the duration of quarantine to the time strictly necessary for the destruction of rats and insects and the complete disinfection of all parts of the vessels and cargo.

3. Organization in all ports, open to international commerce, of a methodic destruction of rats, as well ashore as aboard, and of disinfection, strictly and scientifically controlled, in such a manner that the efficiency of measures taken to destroy rats, insects, and pest bacilli can be officially guaranteed.

4. Obligation for all vessels that put into Mediterranean ports of the Levant or in those of the Red Sea, of the Persian Gulf, of India, of Indo-China, or of other suspected or contaminated countries, to be provided with a sufficient quantity of antipest serum to vaccinate the passengers and all the crew if a case of pest should appear during the voyage.

5. To invite the attention of interested governments to the necessity of appointing sanitary physicians specially instructed with a view to the mission they are to fulfil, commissioned by the controlling power and independent of companies of navigation.

The congress passed a resolution that the International Sanitary Conference that is to meet at Paris, October, 1903, be asked to deliberate on the foregoing desiderata with a view of elaborating a set of regulations for the defence against pest more in conformity with modern science, and with the needs of international commerce.

The next congress will be held at Berlin in 1907, a national congress of hygiene at Marseilles in 1904, a congress of physical education at Geneva in September, 1904, and a section on hygiene will be one of the features of the international universal exposition which Liège is preparing for 1905.

The International Sanitary Conference has been in session in Paris this month. Twenty-five powers are represented at this conference. There are 69 delegates, 39 of whom are members of the medical profession. The invitation to the conference was issued by Italy, and the French ambassador to Italy, Mr. Barrère, presides over the meetings. France is represented besides by Brouardel, Proust, general inspector of the sanitary service in France, Roux of the Pasteur Institute, Calmette of Lille and three other physicians from the French colonies in Africa, with G. Louis, director of consulates. Great Britain is represented by de Bunsen of the British embassy, and two physicians, T. Thomson and F. G. Clemow, with Colonel Richardson of the Indian Medical Service and Mr. Alban. There are 4 official delegates from Germany, including Gaffky of Giessen and Nocht of Hamburg. The delegates from the United States include Surgeon Anderson, medical inspector of the European station, and Col. Gorgas, assistant surgeon-general, U.S.A., late of Havana, both members of the American Medical Association, with Dr. Giddings. The part played by the rats in the dissemination of the plague has been brought to light since the last international conference of the kind, and uniform measures to prevent infection from this source are under discussion.

The American Public Health Association, in which Cuba is now joined to the United States, Canada and Mexico, has held two annual meetings since the date of my last report, one in New Orleans December 8-12, 1902, under the presidency of Dr. Henry D. Holton, of Brattleboro, Vermont, and the other at Washington 26th to 30th of this month, under the presidency of Dr. Walter Wyman, Surgeon-General United States Public Health and Marine Hospital Service. Many interesting papers were read and discussed, on the plague situation, the rôle played by the mosquito in the spread of yellow fever, that of the rat, &c., in the spread of plague, on maritime quarantine, on disinfection and disinfectants, &c. The next annual meeting of this association is to be held in Havana, Cuba, under the presidency of Dr. Carlos J. Finlay, who is so celebrated in connection with the discovery of the conveyance of yellow fever by the mosquito.

The Canadian Medical Association held its annual meeting in London, Ont., August 25-28. Three hundred and two members registered at this meeting. Many important papers were submitted and discussed. The next meeting is to be held at Vancouver, B.C.

*The Quarantine Stations, &c.—Grosse Isle, Que.*—At this station and at its substation of Rimouski 475 vessels have been inspected during the year, 445 at Grosse Isle and 30 at Rimouski. This shows an increase of 57 as compared to last year. 74,237 persons were inspected, an increase of 20,858.

Twenty-four vessels arrived with infectious disease.

The admissions to hospital were 322. They included cases of diphtheria, scarlet fever, chickenpox, measles and enteric fever.

The deaths were seven; one from diphtheria, one from scarlet fever, four from measles and one from tuberculosis.

The medical superintendent in his annual report again strongly urges the need of the station of a second steamer, a deep water wharf, a hospital steam sterilizer, and an administrative building at the western end.

As I submitted to you in my last annual report, the question of rebuilding the old wooden detention sheds, which date from 1832 and 1847, will soon have to be met.

*Halifax, N.S.*—Vessels inspected, 539; an increase of 5[illegible] over last year. 68,961 persons were inspected; an increase of 9,785 over last year.

Eleven vessels arrived with infectious disease.

The admissions to hospital were 97. Of smallpox 2, measles 86, scarlet fever 8, and enteric fever 1.

The deaths were fifteen: 13 from broncho-pneumonia, secondary to measles, 1 from scarlet fever and 1 from enteric fever.

Two steamships were quarantined for smallpox, their passengers landed, and the vessel released after the disinfection of the ship and the crew. During the year there were 800 persons at the station for treatment or for quarantine of observation.

A good winter hospital is very much needed at this station, with a capable steward and matron in permanent resident charge, who would keep the building warm and prepared at all hours for the reception of the sick.

The electric lighting of the station—as has been done for Grosse Isle and William Head—is very desirable.

*St. John, N.B.*—Vessels inspected, 596. Persons inspected, 44,031. Vessels bringing disease, 11. Admissions to hospital, 187. Deaths, 6, viz., measles 2, tuberculosis 2, meningitis 1, diphtheria 1. Persons vaccinated 1,655.

A winter hospital is much needed at this station, of the same nature and for the same reasons as above mentioned for Halifax.

The electric lighting of the station is also very desirable.

*Sydney, C.B.*—Vessels inspected, 221. No infectious disease has reached this port, except one case of measles ex the ss. *Hestia* from Glasgow.

The new arrangement for the steamboat service has worked well, and all inspections have been made immediately on the arrival of the vessels, whether by day or by night.

*Chatham, N.B.*—Vessels inspected, 66. No infectious disease found during the year.

*Charlottetown, P.E.I.*—Vessels inspected, 15. No infectious disease. The quarantine hospital has undergone thorough repair during this year.

*William Head, B.C.*—Vessels inspected, 393; persons inspected. 56,199. Of these the steerage Chinese numbered 10,157, and Chinese crew, 5,255. Japanese steerage, 4,484, and Japanese crew, 2,704. Other Asiatics numbered 206. A total of 22,806 Asiatics. On account of the prevalence of plague in the ports from whence these people came, special examination comprising inspection of glandular regions was given to each and all.

The Chinese immigration was somewhat larger than usual, presumably in view of the impending increase in the tax to take place from January 1, next.

Diseases found on vessels arriving: smallpox, measles, mumps, malaria, and beriberi.

No case of plague occurred at the station during the year, but cases occurred on three steamships running to this port. The American ss. *Hyades* lost her head steward from plague in Hong-Kong in April last. The British ss. *Indrasamha* landed a man sick with plague at Keelung, Formosa, in June last, and on the arrival of the Japanese ss. *Kaga Maru* at Yokohama from Seattle and Victoria in June last a cabin boy was landed with suspicious clinical symptoms of plague.

Two new steamship services with European ports have been established. One via South American, Central American and Mexican ports, and the other via the Suez Canal and Asiatic ports. These vessels thus touch at many ports which are subject to some of the graver quarantinable diseases.

The station has now been fitted with the electric light.

*Victoria, B.C.*—Foreign coasting vessels arrived, 689. None required inspection.

*Vancouver, B.C.*—Ten vessels were inspected during the last quarantine year.

*Temporary frontier and coast inspection.*—In addition to these regular stations we have this year given the country the additional protection of extra inspecting officers at the following points, where peculiar threatening of smallpox, or the reported lack of effective health organization to the south of them, seem to make the importation of smallpox most to be feared. Such extra inspections were carried out for greater or lesser periods at the following places: In Cape Breton, Louisbourg; in Nova Scotia, Canso and Yarmouth; in New Brunswick, McAdam Junction; in Ontario, Owen Sound, Thessalon, Bruce Mines, Sault Ste. Marie, Rainy River, Port Arthur and Fort William; in Manitoba, Sprague, Emerson, Gretna, Morden and Crystal City; in the North-west Territories, North Portal, Coutts and Macleod; in British Columbia, Northport (for Rossland and Nelson), Grand Forks, Greenwood, Huntingdon and Blaine.

*The North-west Territories.*—During the year smallpox appeared in the vicinity of the following points: Onion Lake 1, Milestone 1, Dunn's Ranch 3, Regina 7, Lethbridge 2, Mayton 11, Crooked Lake 3, Calgary 5, Saskatoon 4, Star 2, Jack Fish Lake, 15, Moosejaw 9, Langevin 4, Indian Head 2, Raymond 3, Wolsley 2, Caron 3, Cardston 7, Maple Creek 9, Swift Current 24, Pelletier's Lake 11, Bresaylor 9, Muskeg Lake 6, Medicine Hat 4, Lacombe 24, Tantallon 10, Qu'Appelle 2, Yorkton 1, Willow Bunch 1, Halcro 6, Old Man's Creek 3, Magrath 1, Prince Albert 6; also at Carleton,

Wyngard, Fish Creek, Batoche, Green Lake, Fort à la Corne and Sandy Lake. The average character of the disease was somewhat more severe than during the previous year, yet not severe enough to be fatal, except in four cases.

The disease was chiefly confined to the half-breed population. The Doukhobors, Galicians and Mennonites have shown a marked exemption.

Dr. Patterson, our very efficient public health officer in the Territories, states that he has during the last two years and a half given out about fifty thousand vaccine tubes, and that this general vaccination, previous vaccination, the vaccination of incoming immigrants, and the large number of cases of smallpox of a non-fatal type, render the present population of the Territories a people comparatively immune to smallpox. To-day this disease exists only at two points, Bresaylor and Jack Fish Lake, in the same district.

Dr. Patterson again expresses his high estimate of the courtesy shown him, and of the valuable services rendered at every point by the North-west Mounted Police.

*The Yukon Territory.*—There have not been any cases of the major infectious diseases in this territory during the year.

*Leper Lazaretto, Tracadie, N.B.*—There are now at this institution sixteen patients, ten male and six female, three less than at this time last year. There are also two suspicious cases under observation in the neighbourhood. Four deaths occurred during the year, and one new patient was admitted.

The steam disinfecter, in which bedding, clothing, &c., can be sterilized and rendered safe before being laundried, and the cinder and ash pit, both recommended in my last annual report, have been provided for in this year's estimates.

*Public Works Health Act.*—Your inspector, Mr. C. A. L. Fisher, reports that at all the public works inspected by him during the year he found the medical supervision given thereon, the hospital accommodation and medicines provided, and the sleeping quarters for the men when housed together or in tents to be somewhat of an improvement, even on the very good conditions reported last year, which, he says, shows that contractors are trying to carry out as nearly as possible the requirements of the Public Works (Health) Act, and the regulations thereunder.

I have the honour to be, sir,

Your obedient servant,

F. MONTIZAMBERT, M.D.Ed., I.S.O., F.R.C.S.E., D.C.L.,

*Director-General of Public Health.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 2.

(G. E. Martineau, M.D.)

Office of the Medical Superintendent.
Grosse Isle, Quebec, October 31, 1903.

Sir,—I have the honour to submit this, my annual report of the St. Lawrence quarantine service to October 31, 1903.

There were 445 vessels inspected at this station, being an increase of 57 as compared with the year 1902. Of these only 17 were sailing vessels.

The total number of persons examined was 74,237, being an increase of 20,858 over last year. They were divided among the different classes of passengers, &c., as follows:—1st cabin, 3,225; 2nd cabin, 8,963; steerage, 33,965; cattlemen, 2,904; crews, 24,576; stowaways, 604.

I beg leave respectfully to call your attention to the very large increase in the number of stowaways this season, as compared with former years. In 1901 this was 97; in 1902, 171; while this year the number has been 604. Some of the vessels have carried as many as 23 on a single voyage.

Infectious disease was reported or discovered on the following vessels arriving at this station, named in the order of their arrival: ss. *Pretorian, Lake Ontario, Bavarian, Montrose, Lake Erie, Ionian, Kensington, Lake Manitoba, Dominion, Mount Temple, Lake Champlain, Gladestry, Canada, Tunisian, Parisian, Monmouth, Lake Michigan, Milwaukee, Montreal, Buenos Ayrean, Fremona, Nordstjernen, Teelin Head, and Sicilian.*

The diseases so reported or discovered were: scarlet fever, diphtheria, chicken-pox, measles and typhoid fever.

Twice only persons refused vaccination, although on several occasions parties who had refused to be vaccinated by the ship's surgeon, consented to allow the quarantine officer to do so. The reasons these latter gave for refusal were, 'lack of cleanliness in the methods of the ship's doctor, and neglect to clean or sterilize the lancet that was used on everyone.' I believe that if points were used on board the ships, there would be less trouble for vaccination, especially among British emigrants.

The parties that refused vaccination arrived here on the ss. *Tunisian*, June 19, and on the ss. *Lake Erie*, August 21.

They were landed for the usual period of observation.

This year has been a very busy one at the hospital, where we had up to 132 persons at the same time suffering from different diseases.

Since the opening of the station, this spring, we have always had some patients at the hospital and there are now ten persons therein.

The total number of admissions at the hospital was 322, being an increase of 58 over last year.

The deaths numbered seven, one from diphtheria, one from scarlet fever, four from measles and one from tuberculosis.

One birth occurred in the hospital.

*Quarantine Staff.*—The Rimouski sub-station continued to be in charge of Dr. A. Lapointe, who made the inspection of the weekly mail steamers.

I visited this advance post, and coming up from thence on the mail steamers, made a detailed inspection between Rimouski and Grosse Isle.

*Requirements and improvements.*—I can only repeat here, as it has always been done in the previous reports and upon every possible occasion, that the chief requirements at this station are: a stong and suitable second steamboat and a deep-water wharf.

Another deficiency is that of a steam laundrying disinfecting apparatus at the hospital, so as to sterilize the contaminated linens, clothes, bedding, &c.

*Buildings.*—A new building for the accommodation of the employees has been commenced this year. Another one ought to be erected in the upper division, so as to be used for an office, a surgery, &c.

Some other works and repairs are also absolutely necessary, the list of which is in the hands of our department.

The whole respectfully submitted.

I have the honour to be, sir,
Your obedient servant,
G. E. MARTINEAU, M.D.
*Medical Superintendent of the St. Lawrence Quarantine Service.*

The Honourable
The Minister of Agriculture.
Ottawa.

## No. 3.

(N. E. Mackay, M.D., M.R.C.S.)

Halifax, N.S., October 31, 1903.

Sir,—I have the honour to submit my annual report of the quarantine station at Halifax, N.S., during the year ended October 31, 1903.

We inspected during the quarantine year just ended 539 vessels, an excess of 57 over the previous year and of 228 over the year 1901.

In the same period we examined 8,678 cabin passengers; 6,153 second-class passengers; 32,736 steerage and 21,392 crew. A total of 68,961 souls, an increase of 9,785 over the previous year, and of 38,323 over the year 1901. These facts show that the work of this station is increasing in importance yearly.

Smallpox was discovered on board the ss. *Assyria* from Hamburg, December 24, 1902, and on the ss. *Corinthian,* from Liverpool, on March 23, 1903. In the former the disease broke out amongst the immigrants of whom 534 were on board. The disease was discovered in mustering the passengers. It was of the discrete form and the vesicles were beginning to suppurate. The ship with all on board was sent to the quarantine station, Lawlor's Island, and the crew and passengers were immediately vaccinated. All the immigrants were detained in quarantine of observation for 18 days, but the vessel and crew were released on being thoroughly disinfected. Disinfection was made by sulphur dioxide, mercuric chloride and formaldehyde. The quarantine officer at Boston, the port of destination of the ship, was notified by telegram of the existence of smallpox on board when she arrived in this port. None of the immigrants or crew contracted the disease afterwards, so far as I know.

Besides the case of smallpox there were thirteen cases of measles on board. This disease spread rapidly amongst the children while in quarantine, so much so that we had at one time as many as 40 or 50 patients in the hospital. The mortality was very high, 12 deaths having occurred chiefly from broncho-pneumonia secondary to measles.

This high mortality seems to me to have been due to the fact that the sick had to be placed in a building that had had no fire in it for months previously.

A good hospital is greatly needed at this station, with a capable steward and matron in charge, who would keep the building at all hours in readiness for the reception of patients and who would also nurse the sick.

The case of smallpox on board the ss. *Corinthian* developed amongst the cattlemen. There were 16 of them, and they occupied quarters which were completely isolated from those of the crew and the other passengers. Furthermore, the patient was put in the hospital and separated from his comrades as soon as he took sick, and before the nature of his illness could be made out, and the danger of contagion practically nil. So I allowed all the passengers to land and sent the vessel, cattlemen and crew to Lawlor's Island quarantine station. The cattlemen were vaccinated, as were also the crew, and the former were kept for 18 days under quarantine of observation. After the vessel was disinfected, and the crew bathed and their effects disinfected, she was released on the 25th, and allowed to proceed on her voyage. The quarantine officer at St. John, the port of disinfection, was notified by telegram of the existence of smallpox on the vessel, and what we had done by way of disinfection.

None of the cattlemen, crew or passengers contracted the disease afterwards, so far as I am aware.

The experience I have had with smallpox in my public and private capacity has convinced me that it is not necessary to detain in quarantine of observation any of the crew or passengers on board a ship on which the disease of smallpox broke out on the voyage except those who occupied the same apartments with the patients, and not even these if they show evidence of recent successful vaccination, and if the case was isolated before the appearance of the eruption. Contagion is practically nil till the rash comes out, and not well marked until the vesicles begin to suppurate. As a precautionary measure, however, it would be well to have them bathed and their effects disinfected. In the case of contacts who do not give evidence of recent successful vaccination, I am of opinion that it is only necessary to detain even them until vaccination has had time to take and that every good take should be released on being bathed and their effects disinfected. If the takes are good it shows the disease is not in the system, and the vaccination practically renders them immune to smallpox. Only the non-takes, and those who take badly and those who refuse to be vaccinated should be kept under observation during the incubation period of the disease.

Minor quarantinable diseases were discovered on board the following vessels: ss. *Bavarian,* from Liverpool, November 21, 1 case of enteric fever—sent to General Hospital for treatment; ss. *Corinthian,* from Liverpool, December 8, 5 cases of measles; ss. *Pretorian,* from Liverpool, December 15, 2 cases of measles; ss. *Armenia,* from Hamburg, April 5, 2 cases of measles; ss. *Assyrian,* from Hamburg, April 25, 5 cases of measles; ss. *Bulgaria,* from Hamburg, May 27, 2 cases of measles; ss. *Siberian,* from Liverpool, June 12, 1 case of scarlet fever—an orphan—sent to infectious disease hospital; ss. *Ark,* from Jamaica, 1 case of mumps, and ss. *Corinthian,* from Glasgow, June 24, 1 case of chicken-pox.

Non-quarantinable diseases were found on the following vessels:—Schr. *Emma and Helen,* from Gloucester, November 10, 1 case of quinsy; ss. *Bavarian,* from Liverpool, November 21, 1 case of tonsilitis; ss. *Tunisian,* from Liverpool, November 30, 1 case of influenza; ss. *Pretorian,* from Liverpool, December 15, 1 case broncho-pneumonia; ss. *Bavarian,* from Liverpool, December 28, 3 cases of la grippe; ss. *Tunisian,* from Liverpool, January 4, 1 case of pneumonia; and the ss. *Pretorian,* delirium tremens, 1, and suicide, 1.

Deaths occurred on the voyage to this port from the following causes:—Phthisis, 1; pneumonia, 6; acute-bronchitis, 1; meningitis, 1; peritonitis, 1; acute-alcoholism, 1; delirium tremens, 1; and suicided, 1.

During the year we had 800 persons at the station under treatment and quarantine of observation.

In the same period 97 cases of quarantinable diseases were treated as follows: 2 cases of smallpox, 86 of measles, 8 of scarlet fever and 1 of enteric fever.

Fifteen deaths occurred at the station during the year, viz.: 13 from broncho-pneumonia secondary to measles—all these were children under 10 years of age, belonging to the immigrants ex ss. *Assyria;* one from enteric fever—a middle-aged woman belonging to same contingent—and 1 from scarlet fever.

I have to note with approval that vessels from New York and ports north of it are again exempt from quarantine inspection.

It is to be regretted that the repairs to the ss. *Argus* were not gone on with more promptly than they were. The boat was laid up at Mr. Esdale's request, and the machinery taken apart on October 6, and nothing has yet been done to her.

After a few years of observation and experience we found that inspecting vessels at night did not help the trade of the port to any appreciable degree, for the unloading of ships arriving after 8 or 9 p.m. did not begin usually until 7 in the morning, and besides immigrants cannot be properly examined for disease with artificial light. So for the past year we have endeavoured to dispose of night work as much as possible, and with the co-operation of ship owners and ship agents, we have been fairly successful. The change only now needs to be embodied in the regulations. It is better for all concerned to have inspections made in daylight. This is the practice in other countries.

The plumbing work which was being repaired at the station, when I made my last report, has been finished, and is found to work so far satisfactorily. New upright radiators were placed in the bath-rooms; they are quite an improvement on the old ones.

In my last report I called attention to the condition of the roofs of the hospital, the first-class and the third-class detention buildings. They are leaking badly and need to be attended to. The roof of the sulphur-blast building has also given way and needs prompt attention, otherwise the machinery will be damaged.

In last year's report I called attention to the fact that the ss. *Argus* is too small for the quarantine service of this port. She has no accommodation for carrying the sick to Lawlor's Island, and neither has she suitable quarters for the crew at night, and besides it is not safe to approach a large ship in motion with her, especially if there is any wind blowing or rough sea on. We need badly a larger boat with better accommodations.

I have again to call attention to the need of partitioning off in rooms the third-class detention building for the better accommodation of immigrants. Our accommodation should at least be in keeping with the quarters provided for this class of passengers on board of immigrant ships. The small hospitals should be divided off in two or three rooms each and the ceilings and floors painted. We find these buildings very convenient when there are only a few sick at the station. They are easier made comfortable than the large hospital.

The signalling of incoming vessels by the signal station still continues very unsatisfactory.

I have the honour to be, sir.
Your obedient servant,
N. E. MACKAY, M.D., M.R.C.S.,
*Quarantine Officer.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 4.

(J. E. March, M.D.)

St. John, N.B., October 31. 1903.

Sir,—I have the honour to submit my report for the year ending October 31, 1903.

During this time there were inspected at this station 596 vessels and 44,031 persons, of whom 26,885 were passengers.

One thousand six hundred and fifty-five persons were vaccinated.

Nine hundred and twenty-eight were quarantined at the station for a total of 10,150 days, and 187 were admitted to and treated in hospital for a total of 2,805 days.

Six deaths occurred amongst the children and infants landed here from the following named causes, viz.: measles, 2; tuberculosis, 2; meningitis and laryngeal diphtheria one each.

One child was born.

Quarantinable diseases were reported by or discovered upon the arriving vessels, as follows:—

November 29—SS. *Lake Erie*. measles.

December 6—SS. *Lake Megantic,* measles.

December 13—SS. *Lake Champlain,* smallpox.

December 29—SS. *Lake Ontario*, chicken-pox, measles.

January 5—SS. *Lake Erie,* chicken-pox, measles, diphtheria.

February 9—SS. *Lake Erie,* measles.

February 18—SS. *Lake Megantic,* measles. diphtheria, meningitis.

March 12—SS. *Lake Ontario,* measles.

March 13—SS. *Lake Simcoe,* measles.

March 28—SS. *Lake Erie*, measles.

April 2—SS. *Lake Megantic,* erysipelas, pneumonia, measles.

The last case was discharged from hospital May 26. Since then there have been no further admissions.

I believe that I am again able to report that no quarantinable disease has been permitted to enter the country through this port during the year.

Up to August 15, when the inspection of coastwise vessels from ports north of New York ceased, fifty-one schooners had qualified for and received from me the quarantine officer's time clearance, which was authorized for use at this station last year. These vessels took their crews at St. John and no change could be made in the personnel without invalidating the time clearance. The system seems to be well adapted to this class of coastwise vessels as they are operated at St. John, and, should it be found necessary to re-impose general inspection and vaccination, I would advise that it be given a further trial.

Numerous special reports dealing with the work and needs of the station have been submitted for consideration during the year.

The instructions in regard to the treatment of vessels from plague ports, and all others which have been received from time to time, have been strictly carried out.

I have the honour to be, sir,
Your obedient servant,

J. E. MARCH, *M.D.*,
*Quarantine Officer.*

The Honourable
The Minister of Agriculture.
Ottawa.

## No. 5.

(H. Rindress, M.D.)

North Sydney. October 31, 1903.

Sir,—I have the honour to submit my report for the year ended October 31, 1903.

The total number of ships inspected for the year just ended is 221: 189 steamships, 32 sailing vessels.

I am glad to say that, with the exception of one case of measles on the ss. *Hestia,* arriving here on July 14 from Glasgow, no quarantinable, contagious or infectious disease has reached here from any foreign port.

Smallpox of a mild type, yet undoubtedly smallpox, has been in the county of Cape Breton during the last eight months. At present there are a number of cases in different parts of the county, but in no case has a death been reported. The disease was brought here at first from Newfoundland.

Since navigation opened this year all inspections have been made immediately on arrival of the ships, whether by day or by night.

The steamboat service has been satisfactory.

I have the honour to be, sir,
Your obedient servant,
HORACE RINDRESS, *M.D.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 6.

(P. Conroy, M.D.)

Charlottetown, P.E.I., October 31, 1903.

Sir,—I have the honour to submit my report for the year ending October 31, 1903.

I am pleased to state that no case of disease of an infectious character was found to exist on board any vessel entering at this port during the past year. The hospital has undergone since my last report very thorough and much needed repairs, and it now affords suitable accommodation for the sick.

Vessels coming from ports in Canada, as well as those from points north of New York, being exempt from quarantine inspection during the greater part of the season, renders the numbers of inspections much less than last year.

The total number of arrivals from ports requiring inspection was fifteen.

All of which is respectfully submitted.

I have the honour to be, sir,
Your obedient servant,
P. CONROY, *M.D.,*
*Inspecting Physician.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 7.

(J. Macdonald, M.D.)

Chatham, N.B., October 31, 1903.

Sir,—I have the honour to submit my report for the quarantine year ending October 31, 1903.

Sixty-six vessels were inspected during the year. I am happy to say that no disease of a contagious or infectious character was found on any of the arrivals at this port, and all were admitted to pratique immediately after inspection.

The hospital buildings and caretaker's residence are in fairly good condition. The flues of both buildings were found to be damaged, but were thoroughly repaired during the past summer.

I most respectfully recommend a small outlay for lumber, wherewith to construct a suitable shed or house to protect our boat from the sun and weather during the winter months.

Mr. Currie, the caretaker, is a good carpenter, and could construct the building if furnished with the material. The cost for lumber, nails, shingles, &c., should not exceed twenty-five dollars.

I have the honour to be, sir,
Your obedient servant,

J. MACDONALD, *M.D.*,
*Quarantine Officer.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 8.

(A. T. Watt, M.D.)

Victoria, B.C., October 31, 1903.

Sir,—I have the honour to submit this my report for the year ending October 31, 1903.

During the twelve months just ended there were 393 vessels inspected at this station. This is a smaller number than arrived last year, and is to be accounted for, to a great extent, by a long continued strike in two of the coal mines, which so reduced the output that no coal was procurable for export for about three months. Most of the colliers were consequently laid off. Sailing vessels have also been fewer in number, they having been largely displaced latterly by steamers, particularly in the old country trade. Regular steamship communication is now to be had with European ports—one service via South American, Central American, and Mexican ports (Kosmos line) and the other via Suez canal and Asiatic ports (joint service by China Mutual and Ocean SS. lines). The establishment of these services is noteworthy, as the steamers touch at a great many ports en route which are more or less subject to outbreaks of the graver quarantinable diseases.

The persons examined were as follows:—Cabin passengers, 10,098; steerage, 20,953; members of crew, 25,148. The number of Chinese steerage passengers was considerably increased over that of previous years owing to the rush to get over before the per capita tax is increased from $100 to $500, as it will be on January 1, 1904. The new tax is conceded to be a prohibitory one, so that there will soon be a great decrease in this class of immigration, a consummation entirely desirable from a quarantine standpoint. There will still, however, be a considerable number of Chinese travelling as these people, after being here for a few years, return to China on a visit. This they can do without having to pay the poll-tax again, provided they return here within one year. Emigration from Japan to Canada has been altogether restricted by the Japanese government. Almost the entire number of Japanese steerage passengers are booked for United States points. The number of these passengers examined here was 4,484, including 383 women, and the Japanese members of the crew were 2,704. The Chinese steerage numbered 10,157, including 19 women, and Chinese crew, 5,255. Other Asiatics numbered 206. These all underwent disinfection of their persons and effects before embarking, so that it was not necessary to perform any routine disinfection at this station during the past twelve months. On account of the prevalence of plague in the ports from whence these people came, special examination comprising inspection of glandular regions was given to each and all.

The following diseases were found on vessels in the course of the year, namely:—Smallpox, measles, mumps, malaria, and beri-beri.

One vessel only had to be detained in quarantine during the past year, this being the British barque *Ancona,* which arrived January 9, from San Francisco, and on which one sailor was found with smallpox in the desiccating stage. The crew were landed for observation but no further case developed. The vessel was fumigated and towed to her loading port.

Reference must be made to three of the oriental liners on which cases of plague were discovered while in other ports. The American ss. *Hyades,* while in Hong Kong during April, lost the head steward from plague. The body was found at the bottom of the dry-dock, the man evidently having fallen from the gang plank. The post mortem examination brought out the fact that he had been suffering from plague. He had been off on shore leave for some days when he must have acquired the disease. The steamer was quarantined in Hong Kong before being allowed to start on her voyage. The British ss. *Indrasamha* was quarantined in Keelung, Formosa, where she landed on June 16, one of her Chinese firemen ill with plague, from which he died two days later. The steamer reached here on July 20 without further misadventure. On the arrival of the Japanese ss. *Kaga Maru* at Yokohama, June 15, from Seattle, one of the Japanese cabin boys was found to have fever and an enlarged axillary gland. The vessel was declared infected with plague and ordered into quarantine. Bacteriological investigation of the case was carried on but with negative results. Over 100 rats caught on the steamer were also examined but without the finding of any plague bacilli. Further clinical observation of the case also made it appear doubtful as to its being a true case of pest. The passengers and crew were, however, held in quarantine for the regular period but none became ill. The sick man made a quick recovery. If this case were really one of plague it most certainly would have to be attributed to infected rats on board the vessel, since direct infection is precluded by the long period elapsing from the time the steamer was in any infected port. This period would be about eight weeks from Hong Kong and six from Japan.

In regard to plague in ports in regular communication with British Columbia, I have to report that the usual epidemic occurred in Hong Kong and Amoy, and that cases, although few in number, have continued to appear in other parts of China, in Japan, Formosa, Philippine Islands, Australia, and Honolulu, and also in San Francisco. In Chile, Peru, and Mexico the disease has manifested itself for the first time during the past year. At Mazatlan in Mexico, to which place the disease is said to have been brought from San Francisco, there was a sharp outbreak of over three hundred cases.

Smallpox has become quiescent in Asiatic ports, this being the first year for a number past in which cases of smallpox have not been found on oriental liners. There have been small outbreaks of smallpox in the neighbouring states from time to time, and quarantine has been put on against certain places while the cases continued to be reported, but no general quarantine has been necessary along the border as during previous two years. Epidemics of cholera, but not severe ones, have been reported from Amoy and Shanghai. Many of the cases reported from Shanghai were amongst the local shipping. On one of the coast boats the majority of the crew succumbed to the disease.

During the past year the lighting of the station by electricity has been carried out. This is a much appreciated improvement and has added much to our convenience. The wharf and grounds are lighted with the arc light while the several buildings are fully lighted by incandescent lamps. The permanent staff at the station has been added to by the appointment of an electrician.

Arrangements are now being made for extensive improvement to the wharf, which will give a way from the disinfecting building to the hospital and the saloon passenger quarters and also will enable passengers to be so handled in going through with the disinfecting that those who have passed through the same may be kept completely separated from those who are waiting their turn. At present a certain portion of the wharf has to be used in both going to and coming from the bath-rooms, and constant watchfulness and care is required to avoid re-infection. With the new improvement to the wharf people will pass on in a circle going one way and returning by another, so that all trouble such as we have had to contend with will be avoided. Appropriations for several other improvements are also available, and it is hoped the work will be proceeded with ere long.

I have the honour to be, sir,
Your obedient servant,
A. T. WATT, *M.D.*
*Supt. B.C. Quarantines.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 9.

(W. H. K. Anderson, B.A., M.B.)

Victoria, B.C., October 31, 1903.

Sir,—I have the honour to submit the following report of the laboratory at William Head for the quarantine year 1902-3.

The various processes concerned in the manufacture of Haffkine's plague prophylactic were carried out until the month of June, when this work was discontinued, supplies of this prophylactic fluid being then procurable from regular manufacturers.

Cultures of cholera and kindred germs received from the Minnesota State Board of Health have been investigated and kept alive for further study. Typhoid and other cultures have been got from time to time from the Provincial Board of Health of British Columbia.

The new laboratory building has proved most satisfactory. It is heated by hot water, lighted by both gas and electricity, and supplied with hot and cold water. A large number of new instruments have been added to those already in use. Chiefly, I might mention a new model Zeiss microscope, with the most recent lenses and appliances. It has already proved an immense boon. Other additions include a large incubator, and a Colt acetylene gas machine of the latest design. This latter has just been installed, and is giving entire satisfaction, being used for illuminating purposes, to heat the incubators and to supply the Bunsen burners.

An additional list of bacteriological appliances and supplies has been authorized, and they are now under way, and will still further increase the value and efficacy of this laboratory.

I have the honour to be, sir,
Your obedient servant,
HAROLD ANDERSON, *B.A., M.B.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 10.

(R. L. Fraser, M.D.)

Victoria, B.C., October 31. 1903.

Sir,—I have the honour to submit my report for the year just ended.

No case of contagious disease was found on any vessel touching here during the year.

Coasting vessels from foreign ports north and south of here are by order exempt from inspection for the present.

I have the honour to be, sir,
Your obedient servant,
R. L. FRASER, *M.D.*,
*Quarantine Officer.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 11.

### (L. N. MacKechnie, M.B.)

Vancouver, B.C., October 31, 1903.

Sir,—I have the honour to submit this, my report, for the year just ended.

The number of vessels inspected was 10.

No case of contagious or quarantinable disease arrived at this port during the year.

The inspection of vessels from Blaine and Whatcom on account of smallpox, established February 26, was discontinued September 30.

Inspection of vessels from San Francisco is being continued for plague.

I note the estimates provide for the installation of a telephone at Point Atkinson lighthouse. This will be of great advantage to this port in many ways, and especially so to the quarantine officer.

I have the honour to be, sir,
Your obedient servant,
L. N. MacKECHNIE, *M.B.*,
*Quarantine Officer.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 12.

### (James Patterson, M.D.)

Winnipeg, October 31, 1903.

Sir,—I have the honour to report that during the year ending to-day smallpox developed in the vicinity of the following points in the North-west Territories:—

Onion Lake, 1 ; Milestone, 1 ; Dunn's Ranche, 3; Regina, 7 ; Lethbridge, 2; Mayton, 11; Crooked Lake, 3; Calgary, 5; Saskatoon, 4; Star, 2; Jackfish Lake, 15; Moosejaw, 9; Langevin, 4; Indian Head, 2; Raymond, 3; Wolseley, 2; Caron, 3; Cardston, 7; Maple Creek, 9; Swift Current, 24; Pelletier's Lake, 11; Bresaylor, 9; Muskeg Lake, 6 ; Medicine Hat, 4; Lacombe, 24; Tantallon, 10; Qu'Appelle, 2; Yorkton, 1; Willow Bunch, 1; Halcro, 6; Old Man's Creek, 3; Magrath, 1; Prince Albert, 6.

These figures are not absolutely correct, but they are as nearly so as I can make out from the reports I have had.

Besides the above points and cases the disease prevailed quite extensively, early in the year, at Carleton, Wyngard, Fish Creek, Batoche, Green Lake, Fort LaCorne, and Sandy Lake. I have not any report of the number of cases at each of these points but they were quite numerous.

The average character of the disease was somewhat more severe than during the preceding year; yet not severe enough to be fatal except in four cases.

As previously the cases were largely confined to the native half-breed element. At Moosejaw, Lacombe, Milestone, Raymond, Mayton, Lethbridge, Calgary, Langevin, Wolseley, Caron, Cardston, Indian Head, Regina, Yorkton, Magrath and Old Man's Creek, the parties affected were white citizens. Up to the present the Doukhobors, the Galicians and the Mennonites have been entirely exempt, with perhaps the exception of two cases reported from Star; from the names given I judge them to be Galicians.

I continued the free distribution of vaccine and during the two years and a-half that I have been connected with this work, I have given out about fifty thousand vaccine tubes. All of this was requisitioned for by school trustee boards, boards of health and private individuals. I believe it was all honestly used and that from the reports, verbal or otherwise, I have received, a very large proportion of the vaccinations were sucessful. This general vaccination, previous vaccination, the vaccination of incoming immigrants and the large number of cases of smallpox of a non-fatal type, render the present population of the Territories a people comparatively immune to smallpox. To-day the disease exists only at two points, viz.: Bresaylor and Jackfish Lake.

I have much pleasure in again expressing my high estimate of the courtesy shown me and the valuable services rendered at every point by the North-west Mounted Police.

I am, sir, your obedient servant,

JAMES PATTERSON, M.D.

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 13.

(A. C. Smith, M.D.)

Tracadie, N.B., October 31, 1903.

Sir,—I have the honour to submit for the information of the department the following report on the Leper Hospital at Tracadie, N.B., for the twelve months ending on this date.

There are to-day registered on the books of the Lazaretto the names of sixteen persons—ten males and six females—the youngest nine and the oldest sixty-four years of age. Of these, eleven are of French, three of Icelandic, and two of English origin. Classifying these patients, we may represent the number in the first stage of leprosy to be five; in the second, seven; and in the third, four. There were four deaths during the year, and one new case was admitted from another province. I am at present giving attention, in a neighbouring parish, to the condition of two cases developing suspicious symptoms.

There was more than the usual amount of pulmonary and enteric troubles among the inmates during the year. Lepers respond readily to treatment in these and other intercurrent affections. The frequent illness of those of the patients who are using chaulmoogra oil and creolin caused interruptions in the use of these drugs. But there is no doubt that while under their use the effects are beneficial; the patients all assert that they feel much stronger and better ; the tubercles disappear, and the swollen faces and hands become reduced to nearly a normal condition. The majority of the inmates are able to take daily out-door exercise, and all seem to find enjoyment in life.

The year has been uneventful in the history of the institution. I have again to report that leprosy is steadily decreasing in all our outlying districts; very noticeably so since stricter outside precautionary measures and prompt segregation have been systematically enforced. The absolute number of lepers is much reduced, and the reduction in ratio of the population is still much greater.

On looking over the register containing the history of our leprous families, and of their neighbours free from even hereditary taint of leprosy who associated freely with them and became leprous, one readily becomes convinced of the communicability of the disease through infection. The absence of the disease in those who lived in the immediate neighbourhood of leprous persons but kept aloof from them is very noticeable. The preponderance of authority is in favour of the theory that leprosy is communicable by means of a cut, sore, or abraded surface. This view is confirmed by my own personal investigations. When those affected are not early removed to the lazaretto but remain at home unsegregated other members of the family become leprous.

Mr. Jonathan Hutchinson, of London, England, who for many years has been studying leprosy in foreign parts, is of the opinion that the disease is due to the eating of badly-cured or decayed fish. He believes that eating food from a leper's hands may introduce the bacillus into the stomach where it must be deposited to cause the disease, but admits that leprosy may in exceptional circumstances be communicated from person to person. I am informed by some of our older people that in former days, and even as late as thirty years ago, the inhabitants living along our shores would not eat fresh or well-cured fish, but laid it aside until tainted. 'They wished to have some taste to it.'

The Tracadie lazaretto is fulfilling its object: the segregation of those who would be a danger to the public, and the giving of every possible comfort to those condemned through no fault of their own to its life of seclusion.

I have the honour to be, sir,
Your obedient servant,
**A. C. SMITH, M.D.**

To the Honourable
The Minister of Agriculture,
Ottawa.

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## No. 14.

(Chas. A. L. Fisher, J.P.)

October 31, 1903.

Sir,—I have the honour to submit this my report as Public Works (Health) Inspector for the twelve months ending October 31, 1903, and to append hereto the reports I have received from medical officers, engineers, or contractors, employed in their said capacity, on a majority of the various public works that have come under my personal inspection.

Since my last report I have again covered the territory in the Dominion from the Atlantic to the Pacific Oceans, and have visited and inspected all public works coming under the application of the regulations in force under the Public Works (Health) Act, 1899, which have been brought to my notice.

The year has been an exceptional one in the almost general non-appearance of contagious or infectious diseases among the men employed on the various public works coming under my inspection.

I am pleased to be able to report that at the said public works inspected I found the medical supervision given thereon, the hospital accommodation and medicines provided, and the sleeping quarters for the men when housed together or in tents, to be somewhat of an improvement, even on the very good conditions reported last year, which shows that contractors are trying to carry out as nearly as possible the requirements of the Public Works (Health) Act, 1899, and the regulations thereunder.

In giving a detailed report, as hereunder, of the public works coming under the regulations of the Public Works (Health) Act, 1899, which I have visited and inspected during the past twelve months, I will classify the same under four heads, viz.: canals, railways, bridges, other public works.

## CANALS.

The works of this kind carried on by the Dominion Government, on which a sufficient number of men were employed to bring them under the application of the regulations of the said Act, were four.

*Balsam Lake Division of Trent Canal, Section No. 2.*—These works are near the village of Kirkfield, Ont., and are under contract to Messrs. Larkin & Sangster.

I found from 150 to 200 men employed thereon, many of them living in their own homes, or boarding with private families in the neighbourhood.

The contractors provide a boarding house which is little used, although kept in good sanitary condition, and wholesome food supplied.

Tents and buildings are kept for hospital use if necessary.

A number of the employees are Italians, who live in shacks outside the camp, and which are neither sufficiently cleanly, nor properly ventilated.

No cases of contagious disease had developed up to the time of my inspection, and the employees generally (including the Italians) had been in good health.

These works are under the medical charge of John MacKay, M.D., the summary of whose report thereon is as follows:—

WOODVILLE, October 28, 1903.

*Report Section 2, Balsam Lake Division, Trent Canal.*

Dear Sir,—In my last annual report I was enabled to say that there was not a single death on the works, not an accident worth reporting, and not a bone broken during the year.

I regret to have to report two deaths during this year, one a Canadian, from double pneumonia, and in which I had called in consultation, the other an Italian, who was crushed to death by a car falling off its tramway.

In the last case, Dr. Wood, coroner, made inquiries on the ground, but did not deem an inquest necessary.

Another Italian fell about 20 feet, and broke his leg. As he was anxious to go to Toronto, where he had relatives, I sent him by train to the Toronto General Hospital where he made a good recovery.

Another labourer stepped on a nail, which passed through his foot, breaking a bone in its course. This man made a tedious recovery.

Mr. Sangster, the contractor, made him a fair offer of compensation, which he refused, and brought an action for damages, which was tried before Justice McMahon, and dismissed with costs.

There were besides a number of trifling injuries, colds, and stomach and bowel troubles, but during the year not a case of any contagious disease.

The number of men employed were last winter about 50, during the summer about 175, of whom one-third were Italians, living in their own ill-ventilated and dirty shacks, subsisting on the poorest of diet, but still fresh and rosy in appearance, and able to do a good day's work.

These Italians are fairly temperate, and are peaceable and thrifty.

J. MacKay, *M.D.*

*Balsam Lake Division of Trent Canal, Section No. 3.*—These works are near the village of Gamebridge, Ont., and are under contract to Messrs. Brown & Aylmer.

I found about 150 men employed thereon at time of inspection, a portion of whom are boarded and lodged by the contractors. The sanitary condition of the camp was good. The Italians, who lodge and board themselves, seemed to be thriving on their poor food and in their ill-ventilated shacks.

There had been no outbreak of any contagious disease, and the general health and condition of the men were good. Hospital quarters are provided for in case of necessity. The medical supervision of the employees is in charge of A. Grant, M.D., of Beaverton, Ont.

Beaverton, Ont., October 31, 1903.

Dear Sir,—I have the honour to submit to you a report of the sanitary condition of Section No. 3, Trent Canal, for the year ending October 31, 1903.

I am pleased to inform you that the general health of the men has been good. No contagious diseases. There were a few accidents, two fractures, and some minor troubles.

The boarding houses are very comfortable, and kept in a fairly sanitary condition. Water supply is good.

Hospital accommodations are in accordance with regulations of Act for the preservation of health on public works.

I am your obedient servant,

A. Grant.

*Welland Canal.*—These works are at Port Colborne, Ont., and are under contract to Messrs. Hogan & Macdonell. About 150 men were employed thereon, nearly all of whom boarded and lodged in the neighbourhood.

All sanitary conditions were being well looked after by the contractors.

There had been no outbreak of disease on the works, and the health of the men had been excellent.

Temporary hospital accommodation is always at hand, but in the case of serious accident or disease the men are sent by rail to the permanent hospital at St. Catharines, at the expense of the contractors.

The appointment of a regular supervising medical officer is not necessary, as the medical men of Port Colborne can always be secured within a few minutes.

*St. Andrews Rapids Canal.*—These works are near Winnipeg, Man., and consist of the construction of a lock and dam, for which Messrs. Kelly Bros. & Co. are the contractors.

About 120 men were employed thereon. Sanitary regulations were being well looked after, and all necessary hospital accommodation was provided at Winnipeg. There had been no outbreak of disease, and the health of the men was of the best. Medical attendance has been provided by the contractors when required for trivial accidents, but no permanent medical supervisor is necessary under the conditions existing.

## RAILWAYS.

Public works of this class have been carried on to a greater extent the past year in Manitoba, the North-west Territories and British Columbia, than formerly, thereby adding extensively to the railway mileage of Canada, and opening out large tracts of fine farming land for settlement.

In the province of Nova Scotia very considerable work is being done in the construction by Messrs. Mackenzie, Mann & Co., of a shore line railway from Shelburne to Halifax, with branches.

*Canadian Pacific Railway.*—This company has had under construction in the past twelve months, twelve branches, extensions, or straightening out works, to their lines in the provinces of Quebec, Ontario, Manitoba, the North-west Territories, and British Columbia.

Having visited all these in my official capacity, I am pleased to report that at that time I found the regulations under the Public Works (Health) Act, 1899, being carefully carried out, excellent hospital accommodation provided, the men comfortably housed in tents or buildings, and well fed, the camps and quarters kept in good sanitary condition, and medical supervision by a duly qualified physician in each and all of said works where necessary.

There had been no outbreak of contagious disease, and the health of the employees had been of the best.

I give below the extent and location of these various works, and append thereunder a report thereon lately received from the medical officer of each, as far as such have come to hand.

*Labelle Extension*—(from Labelle to Nominigue, Que., about 28 miles). This work was under contract to Messrs. D. R. McDonald & Co. About 300 men were employed thereon.

The contractors board and lodge about 100 of these in tents, the balance, being Italians, live in tents supplied by the contractors, but board themselves.

Sanitary regulations are well looked after. Tents are on hand for isolation purposes. There is no permanent hospital, patients being sent by rail to the Montreal General Hospital or Hotel Dieu.

The medical officer in charge is Dr. C. Cartier, of L'Annonciation, a synopsis of whose report to me I append as under.

L'ANNONCIATION, October 30, 1903.

Dear Sir,—I send you the report *re* the health and condition of employees on the Canadian Pacific Railway, Labelle extension.

Number of men employed, 250 to 300, or over. There are several camps, and the men are housed in tents, with some sleeping cars. There has been no outbreak of contagious disease.

There have been some trivial accidents, and two deaths, one an Italian boy who fell on the rail and cars passed over both legs. He died from hæmorrhage.

The other, a case of appendicitis, who was sent by his request to his friends in Cornwall, Ont., where he died at the hospital there.

Yours, truly,

C. CARTIER, *M.D.*

*Cartier Section*—(North Bay to Sudbury, reduction of grades). This work was under contract to the Canadian Construction Company.

About 200 men were employed.

There were good sanitary regulations, with hospital accommodation at Sudbury, Ont. There had been no outbreak of contagious disease.

These works were under the charge of Drs. Struthers and Arthur, of Sudbury, as medical supervisors, but no report has been received from them.

*Fort William, Ignace and Rat Portage Sections*—(reductions of grades, Fort William to Winnipeg, Man.). The contractors for this work were Messrs. Foley Bros., Larson & Company.

About 400 men were employed, who were distributed over the various camps, and were boarded and lodged in tents by the contractors.

Tents were on hand for isolation purposes if necessary, and the permanent hospital used was at Rat Portage, Ont.

The medical supervisors over the works were Drs. Scovil and Gunne, of Rat Portage, whose report thereon is as follows:—

RAT PORTAGE, October 19, 1903.

Dear Sir,—We beg leave to report as medical supervisors of construction work on Canadian Pacific Railway between Winnipeg and Fort William.

Visits were made by us every two weeks, giving the men a chance of being attended to each week. Medicines and supplies of all kinds were placed in each camp, and renewed from time to time as required, timekeepers being given full instructions as to using them.

At Rat Portage we had use of Royal Jubilee Hospital, the men being received there when their needs demanded such attention.

On our visits we thoroughly inspected all the camps, and saw that all refuse was burned; also saw carefully after the water supply. As a result of this, there have been no cases of infectious disease in the camps; in fact there has been very little sickness of any kind. Always found the contractors ready to carry out any instructions given them.

They have carefully looked after the comfort and welfare of the men in every way, the camps being large, airy, and well fitted up in every way.

We have the honour to be,

Your obedient servants,

SCOVIL & GUNNE.

*Yorkton Extension*—(Tracklaying, ballasting and surfacing). This work was being done by the Canadian Pacific Railway construction department of Winnipeg, under J. G. Sullivan, division engineer of construction, and T. S. Armstrong, as engineer in charge. About 120 men were employed thereon. A. T. Condell, M.D., was the medical officer in charge, and as he also had charge of the Kirkella branch of Pheasant Hills extension, his report for both will follow my report on the latter.

*Yorkton Extension* (grading, &c., 30 miles).—The work on this extension was under contract to J. D. McArthur, of Winnipeg, Man. About 75 men were employed. There had been no contagious disease, and the sanitary regulations were well looked after. No regular medical officer was in charge, but the works were casually looked over by Dr. Condell, who had charge of the adjoining section.

*Pheasant Hills Extension*—(Kirkella to Neudorf). This work was being done by the Canadian Pacific Railway construction department, with J. G. Sullivan, Winnipeg, division engineer, and W. P. Cotton, engineer in charge of the works.

About 350 men were employed thereon. There had not been any outbreak of contagious disease, and the health of the men was generally good. Temporary hospital accommodation was always provided, but the hospitals at Brandon and Winnipeg were used when necessary. A. T. Condell, of Elkhorn, was the medical officer in charge, and his report to me for the year on the Yorkton extension and the Kirkella branch follows.

ELKHORN, MAN., October 30, 1903.

Dear Sir,—I have the honour to submit my annual report of the health of the men engaged in Canadian Pacific Railway construction on the Kirkella and Yorkton branches:—

*Kirkella Branch.*—About 300 men on an average have been employed. Labour employed has been British, Scandinavian, Galician, and latterly a few Italians.

As in last year's works, we have been enabled to use Brandon and Winnipeg hospitals. Every convenience and facility has been given by the company for the early removal of all patients requiring hospital treatment. There has been very little sickness, and very few accidents during the progress of the work. There has not been a single case of acute infectious disease.

A few cases of gastritis, two of acute nephritis, somewhat alarming but soon clearing up.

Accidents.—Only one fatality, that of a Galician injured on June 1 at Sacanville by climbing on moving gravel train; had right foot and left leg crushed above the ankle. He was immediately removed to the hospital and injuries attended to, but failed to recover. There were some smaller handcar accidents, but these injuries were not serious. One pumpman sustained a fracture of both bones of right forearm.

The instructions of your department were closely followed.

The condition of the camps and attention to sanitary measures marked an advance on the previous year.

*Yorkton Extension.*—About 120 men were employed on this work. As the work was largely that of surfacing and ballasting, no serious accidents or injuries occurred. The health and general condition of the men were excellent throughout. One case of erysipelas occurred, and one case of acute bronchitis.

The utmost attention to the health and comfort of the camps was exercised by the company's officers.

All of which is respectfully submitted.

I have the honour to be, sir,

Yours faithfully,

A. T. CONDELL, *M.D.*

*Pheasant Hills Extension*—(Neudorf to Jumping Deer Creek).—This work, 42 miles, was under contract to J. D. McArthur, Winnipeg. About 200 men were employed thereon. These were housed in tents, and boarded by the contractor.

There had been no outbreak of contagious or infectious disease, and the health of the men was remarkably good.

Sanitary regulations were well looked after, and temporary hospital accommodation was always provided.

C. M. Pierson, M.D., has been the medical officer in charge of the works, and his report to me thereon is as follows, viz.:

NEUDORF, ASSA., October 30, 1903.

Dear Sir,—I have been on the construction since August 1, and report a pretty clean bill of health, there having been no sickness of any importance, with the exception of diarrhæa for the first couple weeks or so, due to alkali water.

I have inspected the tents, cook camps, &c., and found everything satisfactory at every visit.

At each camp one roomy tent, heated, &c., was kept for the benefit of possible patients. I have only had to isolate one patient, a case of erysipelas, and have encountered no other contagious or infectious disease. There have been no deaths from any cause.

Owing to the nature of the country, sanitary regulations have been easy to carry out.

Hoping that you will find this report satisfactory, and expressing my regret that I did not have the opportunity and honour of meeting you while you were in this part of the country,

I am, yours truly,
C. M. PIERSON, *M.D., C.M.*

*Broadview Section*—(Reduction of grades Flemming and Broadview).—This work was under contract to P. Lamb. Only a comparatively small body of men were employed thereon. Their health was good, there having been no outbreak of disease, and sanitary regulations were well attended to. There was no regular medical officer in charge, that not being necessary.

*Arcola-Regina Extension*—(113 miles; grading, bridging, &c.).—This work was under contract to Messrs. Foley Bros., Larson & Company. A. McCullough, engineer in charge. The number of men employed was about 300. They were housed in tents, and well supplied with the best of food by the contractors.

The health of the men was of the best. There were no cases of contagious or infectious disease, with the exception of two or three cases of mumps which were properly isolated and no further cases developed.

Good permanent hospital accommodation was at hand at Regina.

J. A. Graham, M.D., was the medical officer in charge of the employees, and his report to me thereon follows, viz.:

REGINA, October 31, 1903.

Dear Sir,—As I have been the medical officer in charge of the employees on the Arcola-Regina extension of the Canadian Pacific Railway, I beg to make the following report:

There have been working on the works since May of this year about 300 men, who have been living in tents.

The sanitary condition of each camp has been good, there being no infectious diseases except in the case of one camp, where three cases of mumps developed. These cases I had properly isolated from the camps in which they occurred, and there were no further cases developed.

I consider the health of the men on this work has been first class, there being no serious cases of illness of any kind during the summer.

I am, dear sir,
Yours truly,
J. A. GRAHAM, *M.D.*

*Swift Current Section*—(Grading, bridging, &c., 60 miles).—This work was under contract to Messrs. Foley Bros., Larson & Company, with chief quarters at Morse, N.W.T. About 300 men were employed thereon.

The health of the men was exceptionally good, and no sickness has occurred of any account. There were nine camps or more, the men being housed in tents and boarded by the contractors. Hospital accommodation was provided on the line, and water closets for each camp.

F. J. Ewing, M.D., was the medical officer in charge, and his report for the season follows :—

MORSE, N.W.T., October 27, 1903.

Dear Sir,—Permit me to report to you the sanitary condition of the Swift Current section of the Canadian Pacific Railway work.

About 300 men employed. Twelve camps established. Sleeping accommodation ample in each camp, each man having his own bed and bedding, which is washed or aired each week. Water closets in each camp, which are properly looked after.

Surroundings of each camp kept clean, and all waste products either buried or burned.

Food, plain, wholesome, and ample in amount.

Proper and sufficient hospital accommodation located on the line, with male nurses, Medical officer visits each camp once a week. No sickness has occurred on the line, excepting a few slight colds.

I am, respectfully yours,
F. J. EWING, *M.D.*

*Medicine Hat Section.*—This work was also under contract to Messrs. Foley Bros., Larson & Company. Few men were employed, but the conditions were similar to those on the Swift Current section. No medical officer was necessary, but nevertheless Dr. Ewing was occasionally supervising the works.

*Revelstoke Section*—(12 miles west, near Clanwilliam).—This work was for the deviation of the main line, and was under contract to J. W. Stewart. Only a small body of men were employed. All health and sanitary conditions favourable. No regular medical officer was necessary.

*Canadian Northern Railway.*—This company has had under construction during the past year fourteen extensions to their lines in Manitoba and the North-west Territories. Having visited and inspected each of the said works, I have to report that I found the regulations under the Public Works (Health) Act, 1899, being carefully carried out, the hospital accommodation being fully up to the requirements, the men being supplied with ample plain, wholesome food, and well housed, the quarters and various camps being kept in good sanitary condition, and the various works, when necessary, having careful medical supervision by a duly qualified physician, each of whom was either under the charge of R. Mackenzie, M.D., or C. A. Mackenzie, M.D., both of Winnipeg, as the contractors chief medical officers, both of whom gave me every assistance towards my making the necessary inspections.

There were no contagious diseases at any of the camps, and the general health and condition of the employees were all that could be desired.

The extent of these various works and the reports received from the several medical officers in charge thereof will be found below under my description of each of the said works, viz.:—

*Erwood Extension*—(Completion of grade and building of track between Erwood and Melfort, 85 miles).—This work was being done by Neil Keith, contractor. Four to five hundred men were employed thereon. W. K. Hall, M.D., was the medical officer in charge of the men, and his report for the past season is as under, viz.:

ERWOOD, N.W.T., October 18, 1903.

Dear Sir,—I beg leave to submit the following medical report for this season on the Erwood extension of the C.N.R.

The sanitary and health conditions have been excellent, there being no infectious diseases or grave cases which required hospital treatment.

The greater proportion of the men lived in houses constructed by themselves, and holding from two to five persons.

There were several camps averaging about 75 men. These camps were changed from place to place about every six weeks. The men were strung along a line not exceeding twenty miles.

I visited the men on an average of every ten days.

The maximum number of men on the work was 490, and the minimum 220.

I have one large hospital tent on hand (capacity of holding twenty patients), but never used it, as I had no need for doing so.

I am, dear sir,
Yours truly,
W. K. HALL, *M.D.*

*Grandview Extension*—(Grandview section).—This work was under contract to G. Strenel. About 350 men were employed. G. Bottomley, of Grandview, was the medical officer in charge, and his report for the past summer's work is as follows, viz.:

GRANDVIEW, Man., October 31, 1903.

Dear Sir,—I now beg to give you a short summary of the work among the men who have been under my charge during the summer.

I am happy to say that the health of all the men has been remarkably good. No cases of any infectious or contagious disease have broken out. There have been two cases of erysipelas, both of which were sent to the Dauphin hospital. Any other cases of sickness have been of a mild nature, such as bronchitis and rheumatism, and have not needed hospital treatment.

Among the accidents, there have been one case of Potts' fracture which was sent to the St. Boniface hospital, and one case of blood poisoning from a nail in hand, which was sent to the Dauphin hospital, the patient recovering with the loss of one finger. A couple of cases of fractured ribs were treated in camp, and several cases of cuts on the feet and legs from adzes used by the bridge carpenters, but none of these proved serious.

Hoping the above statement will meet with the requirements,

I am, yours very truly,
G. BOTTOMLEY.

*Spirits Creek Section*—(End of Grandview section to Spirits Creek). This work was under contract to G. Strenel. About 400 men were employed. There had been no contagious disease, and the health of the men was excellent.

L. J. Farrell, M.D., was the medical officer in charge. No report has been received from him, but the requirements of the (Health) Act regulations were well carried out as to sanitary matters and hospital accommodation.

*Saskatoon Section*—(Spirits Creek to Saskatoon).—This work was under contract by Mackenzie, Mann & Co. A large body of men were employed, who were well housed in tents, well fed, and had all necessary hospital accommodation. There had been no outbreak of contagious disease, and the health of the men had been generally good.

Dr. Harvey was the medical officer in charge, but no report from him has come to hand.

*Clark's Crossing Section*—(From Clark's Crossing to 50 miles east).—This work was under contract to J. D. McArthur. About 300 men were employed, and health regulations were well carried out. Dr. Mitchell was the medical officer in charge, and his report thereon for the season is as under, viz.:

CLARK'S CROSSING, Sask., OSLER P.O., N.W.T., October 31, 1903.

Dear Sir,—I beg to submit the following report on the health conditions prevailing during the six months beginning May 1, ending October 31, 1903, on the construction of Grandview extension of Canadian Northern Railway, 50 miles east of Clark's Crossing of the S. Saskatchewan river, of the medical supervision of which I have had charge.

I have my headquarters here, and have a large tent suitable for hospital purposes, also a smaller one in case of infectious patients.

The grading extends from here 50 miles, and this ground I cover once weekly, calling on the different camps, supervising sanitation, &c.

There have been from 200 to 300 men on an average employed, embracing many nationalities. The sanitary arrangements have been fairly good.

The water supply derived here from the river and from wells on the grade has been very good, and has had no apparent injurious effect, although alkaline in places. Pits have been dug at the different camps for refuse, and everything about kept as clean as possible.

There have been very few complaints as to food, and as far as I can see there would be no occasion for any.

There had been no infectious diseases, or serious accidents, and the health of the men was generally good.

Any further information will be gladly furnished.

Yours truly,
J. Mitchell. *M.B., Tor.,*
*Physician in charge of work.*

*Neepawa Extension*—(From south of Neepawa to Carberry, 20 miles). Messrs. Mackenzie, Mann & Co. were the contractors for this work. Only a small body of men were employed thereon. The health of the employees was generally good, the sanitary regulations well looked after, and there were no cases of contagious disease. A resident medical officer was not necessary, but Dr. Leech had casual supervision.

*Portage Extension*—(West from Portage la Prairie to Carberry). About 150 to 200 men were employed on this work. Dr. Ponton was the medical officer in charge, under C. A. Mackenzie, M.D., as chief, and a report of the latter thereon will be found following the description of the Hudson Bay branch.

*Greenway Extension*—(From Greenway to Wakopa, 45 miles) About 250 men were employed thereon. At the time of my inspection Dr. Stephen Hepworth was in charge as medical officer, under C. A. Mackenzie, M.D., and the latter's report thereon will be found following the next construction work reported.

*Hudson's Bay Branch*—(Winnipeg to Oak Point, about 17 miles). Only a small body of men were employed thereon. Messrs, Mackenzie, Mann & Co. were the contractors for this branch, and the two previous mentioned extensions.

C. A. Mackenzie, M.D., had this branch under his personal supervision, and his report thereon, together with those of the Greenway and Portage extensions, follows as under, viz.:

Winnipeg, Man., October 28, 1903.

Dear Sir,—I herewith beg to submit to you report to date on the several branches of the Canadian Northern Railway under my medical supervision.

*Portage Extension.*—This line runs west from Portage la Prairie towards Carberry. About 35 miles is constructed to date. The number of men working on the extension during the season averaged about 175, one-half English speaking and one-half Galicians.

The health of the men has been very good, only six cases of sickness being treated, one cystitis, three influenza and two rheumatism. These cases were treated in the Portage la Prairie General Hospital.

In all the different camps the hygienic conditions were very carefully looked after. Dr. Ponton had charge of this work.

*Greenway Extension.*—This branch runs from Greenway to Wakopa, a distance of about 45 miles. The number of men working during the season averaged about

200. The health of the men has been exceptionally good, the only case of illness being that of the doctor in charge, Dr. Hepworth, who died from typhoid fever.

Two trivial accidents occurred during the summer. These were two cases of bruised hands, one of which necessitated an amputation of one of the fingers, which operation was successfully performed.

For hospital accommodation a tent with a capacity for eight single beds was provided, but owing to the good health of the men this was not used to any extent. After Dr. Hepworth's death, Dr. Ponton had charge of the work.

*Hudson's Bay Branch.*—This line runs from Winnipeg to Oak Point. It was started last year, and the remainder, a distance of fifteen miles, was completed this year.

There was only one case of sickness on this work, that being a case of appendicitis that was successfully operated on.

The sanitary conditions of all the camps were good.

This branch was under my own supervision.

Hoping this will be satisfactory,

I remain, your obedient servant,

C. A. MACKENZIE.

*Rossburn Branch*—(From end of extension to Rossburn, 60 miles). This work was being carried on by Messrs. Mackenzie, Mann & Co. About 300 men were employed thereon. Thos. Leech, M.D., was the chief medical officer in charge, and his report thereon is as follows, viz.:

NEEPAWA, October, 30, 1903.

Dear Sir,—I hereby beg leave to submit to you the following health report of the Canadian Northern Railway extension on the Rossburn branch, which employed about 300 men.

A resident physician was placed on the work, with headquarters at one of the central camps, who visited each of the other camps every week, attended to the medical wants of the men, and looked well after the sanitary condition of the camps.

No contagious or epidemic disease invaded the camps during the season.

Hospital accommodation was furnished for the men at the Shoal Lake Victorian Hospital, six miles distant, where two typhoid and several minor accident cases were treated at the expense of the Canadian Northern Railway medical department.

Yours truly,

THOS. LEECH, *M.D.*,

*Medical Superintendent.*

*Emerson Section*—(Grading, &c., east).—This work was being carried on by Wm. Robinson. Only a small number of men were employed, all of whom were in excellent health, and the sanitary regulations well looked after. There was no regular medical officer in charge.

*Strathcona Section*—(From Strathcona to Edmonton).—This work was being done under Messrs. Mackenzie, Mann & Co. Only a small body of men were employed thereon, all being in the best of health.

No regular medical officer had supervision of the work, all the medical services and hospital requirements necessary being obtainable at Edmonton with the utmost despatch.

*Edmonton Work*—(Building station and grading). Messrs. Mackenzie, Mann & Co. had this work in charge. Only a small body of men were employed, and the health conditions were excellent. Medical and hospital requirements close at hand.

*Lloydminster Section*—(Between Saskatoon and Edmonton). This section is being constructed through what is known as the 'Barr Colony.' The work is under contract to Messrs. Still & Gay.

The camp was not a large one, only a comparatively small body of men being employed at the time of my visit. The health of the men was good, and careful sanitary arrangements were being arranged for. The camp was entirely one of tents, and all necessary tents for hospital use were provided. As the work had only just been started at the time of my inspection no resident medical officer had been appointed, but that was being arranged for, and one has since been appointed, but probably owing to the difficulty and delay of communication no report from the said physician has reached me as yet.

*St. Mary's River Railway.*—This company under lease or ownership by the Alberta Railway and Coal Company was constructing a line from Spring Coulee to Cardston.

Only a small body of men were employed. The health of all was good, most of the men living at their own homes along the line.

Splendid hospital accommodation was at hand at Lethbridge, with telephone communication.

No regular medical officer was employed by the contractor, but N. H. Mewburn, M.D., had general supervision on behalf of the Alberta Railway and Coal Company, and his report on the said construction follows, viz.:

LETHBRIDGE, October 31, 1903.

Dear Sir,—The construction work on the St. Mary's River R.R. has been going on for nearly four (4) months. Grading has been done by a contractor with labour mostly supplied by farmers living along the line of work. I have no medical arrangements with the contractor.

Up to the 11th of last month the St. Mary's River R.R. had a gang of not more than twenty-five men working; since then this has been gradually increased to fifty or sixty. This will be reduced in two weeks or more, depending upon weather, to fifteen or twenty, who will go into winter quarters on the St. Mary's river. At no time has the force employed by the St. Mary's River R.R. exceeded seventy-five men. The men live in camps (tents) and warding cars, which are clean and in good condition.

There has up to this date been no sickness.

There is a daily train service between the camps and Lethbridge, as well as telephone connection, so that the sick can come in, or doctor go out, as necessary. At Lethbridge there is a well equipped hospital, used by the company for its employees (the Galt Hospital). There are extra tents on hand to be used for isolation purposes if required.

Yours truly,

R. H. MEWBURN.

*Vancouver, Westminster and Yukon Railway*—(Construction work near New Westminster, B.C.). I found the work on this line at a standstill, owing to an injunction having been granted, and no large body of men were being housed or boarded by the company or contractors.

*Prince Edward Island Railway—Murray Harbour Branch*—(Charlottetown to Murray Harbour). This branch is being built by the Dominion Government. Mr. Willard Kitchen is the contractor, with his headquarters at Murray River, P.E.I.

The health and sanitary conditions of the men have been well looked after, and there has never been any contagious disease.

Dr. Lester Brehaut, of Murray River, has had general supervision over the employees, and his report thereon follows, viz.:

MURRAY RIVER, P.E.I., October 27, 1903.

Dear Sir,—The men employed by Mr. Willard Kitchen are accommodated in houses of good sanitary condition. During the season there have been no deaths, and practically no disease of any kind. Contagious diseases there have been none.

Accidents have been few and minor in nature. Good accommodation for sick men is easily available from any part of the road a-building.

Yours truly,

LESTER BREHAUT, *M.D.*

*Cape Breton Railway*—(From Port Hawkesbury, C.B., to Sydney, C.B.). The headquarters camp had been removed since last year from Port Hawkesbury to St. Peters, C.B., and the road was in operation between those points, but at the time of my visit to the latter place all construction work had been discontinued. P. A. Macdonald, of Port Hawkesbury, had been the medical officer in charge during construction.

*Halifax and South-western Railway*—(New Germany and Caledonia Branch).—The contract for the construction of this branch is in the hands of Mackenzie, Mann & Co. About 125 men were employed thereon, and their health was excellent.

There had been one case of typhoid fever, and the patient was well nursed and attended to and made recovery. The medical supervision of the men was in charge of W. H. Cole, M.D., whose report thereon follows, viz.:

CALEDONIA, QUEEN'S CO., N.S., October 26, 1903.

Dear Sir,—In reporting to you for the past year *re* the health of the employees on the Caledonia branch of the Halifax and South-western Railway, I have to say that there has only been one case during the year of contagious or infectious disease, and that was a mild case of typhoid fever in August last which came under the care of my assistant, Dr. J. C. Feindel, of New Germany, N.S. The patient (an Italian) was well cared for (hospital and nurse being provided at our expense), and made a good recovery.

The health of the men in general has been exceptionally good.

We have only had one accident worthy of note during the year, and that occurred a few days ago. One of the brakesmen on the construction train lost a thumb by getting it crushed while in the act of coupling cars. He is doing well and will soon be able to resume work.

The number of men employed has averaged from 70 to 180.

The branch is about completed. A regular train service will probably be established within another month.

Your obedient servant,

W. H. COLE.

*Medical Officer.*

*Cal. Br. H. & S. W. Ry.—Liverpool Section*—(Between Queen's County line and Liverpool River). The contractors for this section were The Atlantic Contracting Co. About 300 men were employed thereon.

The health of the men was excellent, there having virtually been no sickness and no accidents. Hospital accommodation (tents) was provided. F. P. Smith, M.D., was the medical officer in charge, and his report thereon is as follows, viz.:

MILL VILLAGE, N.S., October 30, 1903.

Dear Sir,—I beg to give you a report of labourers on the Halifax and South-western Railway construction between Queen's county line and Liverpool river.

Maskey & Moroson have graded about 2 miles of road, and another mile under construction, which is between the county line and Portmedway river. They have about 100 men employed. There has been no sickness among them, except slight colds and coughs, but nothing to confine them to camp. There have not been any accidents whatever.

Mr. Caselins has about 200 men employed, and has about 2 miles graded, and another under construction. There has been no sickness among them except colds, &c., and no accidents whatever.

The camps are on good high dry ground, and comparatively clean and healthy.

The contractors are very ready and willing to do anything for the comfort and health of their men. They are about moving into winter quarters now, which are good comfortable houses where they can keep dry and warm.

I remain, yours very truly,

F. P. Smith.

*Bridgewater Section*—(From Bridgewater to Queen's County line). The Atlantic Contracting Company are the contractors for this work. About 300 to 400 men were employed thereon. The health of the men has been good, with the exception of one case of typhoid fever. The accidents have been few and of minor importance. Tents are provided for hospital purposes.

H. A. March, M.D., was the medical officer in charge of the men on this section, and his report thereon is as under:

Bridgewater, N.S., October 30, 1903.

Sir,—As medical officer in charge of men employed in the construction of the Halifax and South-western Railway, for the district extending from Bridgewater to the Queen's county line, I beg to submit the following report:

The work began about the middle of July, over a distance of fifteen miles settled country. Average number of men under my care, 350. No hospital within the county with the exception of the Marine hospital at Lunenburg town.

A large number of the men employed live within the neighbourhood of the line of railroad, however, and in case of sickness would be cared for in their own homes. If an epidemic should occur, tent hospitals could be established at any point.

Thus far there has been no serious sickness, with one exception, a case of typhoid fever. This patient was removed to a private residence, the municipal health officer notified, and precautions taken against the further spread of the disease.

One fracture of the thigh and a few minor accidents have fallen to my lot, slight attacks of diarrhœa, a few cases of dysentry, and in the later months some cases of acute bronchitis have claimed my attention.

The season has been an exceptionally favourable one for railroad construction.

I have visited the camps regularly once a week, besides visiting and rendering assistance whenever called upon to do so.

I have the honour to be, sir,

Yours obediently,

H. A. March, *M.D.*

*Hubbard's Cove Section*—(Bridgewater to Mahone Bay). This work was under contract to Mr. Angus Sinclair, C.E. A considerable body of men were employed thereon. The health of the men was generally good, but there had been one death from pneumonia. Hospital tents were ready for use if necessary. Medical supervision of the employees was under the charge of Dr. Thos. Verner, a summary of whose report is given below, viz.:

HUBBARD'S COVE, N.S., October 31, 1903.

Dear Sir,—In conformity with the Health Act, I beg to give you a report of the men employed on the Halifax and South-western Railway under my care up to October 31, 1903.

There were a few trifling accidents from powder, dynamite and falling rocks. There were 5 cases of pneumonia; one death therefrom. There were 15 cases of bronchitis; all recovered. The other diseases I mention were all of a minor nature, and all are better now. I have had a lot of colds, but of a trivial nature.

Yours sincerely,

THOS. VERNER, *M.D.*

*Mahone Bay Section*—(Mahone Bay to Chester Basin). This work was under contract to Mr. Angus Sinclair, C.E. About 400 men were employed thereon. The health of the employees was very good, there being no contagious or infectious diseases. The sanitary conditions of the camps was being looked after, and the men were well housed. Dr. G. Ross Faulkner was the medical officer in charge of the employees, and his report thereon is as follows, viz.:

MAHONE BAY, N.S., October 31, 1903.

Report of medical officer on *Section 3, Halifax and South-western Railway,* between Mahone Bay and Chester Basin.

Number of miles in section, 12. Number of men under supervision during different months, beginning April 1, 1903, 200-440. Visited all men at work either on the work or in camps, weekly. Special visits whenever summoned, and the privilege of office treatment to all the men. Telephone communication every four miles on section.

Private houses available for patients with competent attendants all along the section. Medicines dispensed on weekly and special visits whenever asked for.

Sanitary condition of camps and boarding houses, good. Deaths among employees on section, none. Infectious diseases, none. Accidents were very rare and were of no serious import; all made good recovery, and all were well cared for during inability. Very little serious or prolonged illness, a fortnight being the longest experienced by any one. Infectious or contagious diseases fortunately did not occur, but ample provision would have been made for them had such occurred by the municipal authorities, so I had not considered it necessary to carry out that condition of the Act.

I am forwarding this report in compliance with the terms of the Act (Reg., sec. E), and I think I can safely add that the attendance has been on the whole entirely satisfactory to the employees. I had provided a substitute to attend them in the event of my absence, and endeavoured to serve the physical interests of all workmen to the best of my ability.

Yours truly,

G. ROSS FAULKNER, *M.D.*
*Med. officer H. & S. W. Ry., Sec. 3.*

*Chester Section*—(Chester to Halifax). This section was also under contract to Mr. Angus Sinclair, C.E. About 750 men were employed thereon. The health of the employees was generally good, there being no contagious disease, and all were well housed under sanitary conditions. Tents or buildings were always available in the event of necessity.

Drs. Hebb and Morse were the supervising medical officers, and their report is as follows, viz.:

CHESTER, N.S., October 31, 1903.

Dear Sir,—In accordance with the Dominion Statute, dated May 13, 1903, we beg leave to make the following report of medical service on the construction of the Halifax and South-western Railway.

The number of men under our charge for medical attendance each month since November, 1902, has varied from less than 100 to about 950. The men have been free from infectious diseases of all kinds, have had but minor ailments, accidents chiefly of a minor nature. One death due to dynamite explosion (premature).

The men have been housed in comfortable quarters, generally speaking with some regard to hygienic conditions.

Respectfully submitted,
Your obedient servants,
DRS. HEBB and MORSE.

*Chateauguay and Northern Railway.* This is being constructed between the city of Montreal and the town of Joliette. Mr. W. J. Poupore is the contractor for the grading between Charlemagne and Joliette, and Mr. J. T. Schell the contractor for grading between the city of Montreal and Bout de l'Ile. There were about 300 men employed on both sections, many of them residing in the neighbourhood, the remainder camped in tents and boarded by the contractors.

The health of the men was good, and all conditions favourable. Hospital accommodation was provided in the city of Montreal, and medical attendance within telephone call, and either could be reached by rail transported patients within an hour.

## BRIDGES.

There are only three works of this kind being constructed at present, as far as I have been made aware, that come under the application of the Public Works (Health) Act, 1899, and the regulations thereunder. They are as under:—

*The Chateauguay and Northern Bridge.* This is being constructed from Bout de l'Ile to Charlemagne. Mr. W. J. Poupore is the contractor therefor. About 100 men were employed thereon most of whom lived or boarded in the surrounding neighbourhood or in the city of Montreal. The health of the men and surroundings was generally good. No medical officers were specially in charge, they and necessary hospital accommodation being easily obtained in the city of Montreal.

*The Quebec Bridge.* This is under construction from the city of Quebec to Point Levis. The men employed board and lodge with surrounding families, or live in their homes. The health of employees has been good, and no contagious disease has broken out. Hospital accommodation and medical attendance are provided for in the city of Quebec.

*The Hillsborough Bridge.* This is being built from Charlottetown, P.E.I., and is to form the connection for the Murray Harbour branch of the Prince Edward Island Railway. Mr. M. J. Heney is the contractor from and under the supervision of the Dominion Government.

A considerable body of men were employed thereon, who were being well looked after as to board, lodgings and sanitary conditions. The health of the men has been generally good, and no contagious diseases have developed among them. P. Conroy, M.D., is the medical officer supervising the employees, and a report from him thereon to date is as follows, viz.:

CHARLOTTETOWN, P.E.I., October 31, 1903.

Sir,—I beg leave to submit my report as to the condition of the men employed in the Hillsborough bridge construction, for the year ending October 31, 1903.

I may say that every provision is made by the contractor for the proper care and treatment of the men employed on this work. Although the sinking of deep caissons under heavy atmospheric pressure is attended with extreme danger to life, there has as yet been only one death from that cause. There have been several severe cases of caisson disease, but excepting in one case all ended in recovery.

No epidemic has occurred among the men, and the accidents were all of a minor nature. Ample accommodation is made at the hospital here for all cases of sickness or injury.

The number of men employed varied between 300 and 400.

I am, sir,
Your obedient servant,
P. CONROY, *M.D.*

OTHER PUBLIC WORKS.

*High Level Pier*—(Montreal Harbour). This work was under contract to Malone & Poupore. A considerable body of men were employed, but they lived at their own homes or boarded and lodged in the surrounding neighbourhood. All hospital requirements and medical attendance when necessary are provided at Montreal.

*Dock and Ice Breakers*—(City of Three Rivers).—This work is being constructed by the Dominion Government, and is under contract to Mr. Randolph Macdonald.

About 75 to 100 men were employed thereat. About two-thirds of the men employed live in their own homes, and the remainder are well looked after by the contractor. The men were in the best of health, and no serious disease had broken out. There is no regular medical supervisor, and the General Hospital at Three Rivers would be used if necessary.

*Wharf at Grand Vallée*—(Gaspé County, Que.).—This work is being constructed by the Dominion Government, and is under contract to Mr. Henry Smith. Owing to the small number of men employed, and these living in their own homes, the work does not come under the application of the Public Works (Health) Act 1899, but some complaints having been made, and it being reported to me that an epidemic of typhoid fever had broken out at said works, I communicated with the contractor as to the facts, and beg to submit his report thereon as under, viz.:

GRAND VALLEE, QUE., October 28, 1903.

Dear Sir,—Your favour of the 16th received, and in reply, we were not aware of the Act which you have the kindness to send.

The parties are mistaken, as the few cases of typhoid fever were at Little Valley, distance about 6 miles from here, and the authorities had the places isolated, and we have not heard anything of more cases since August. We have been working here for the last two summers, but never employed more than 30 men at one time and now have only 20 men at work. We are not running any camp or boarding establishment; most of the men are residents of the place, and live at home, and the remainder are boarding in private houses.

I have the honour to remain,
Yours truly,
HENRY SMITH.

*Breakwater*—(Depot Harbour, Ont.).—This work is being carried on by the Dominion Government, and is under contract to Messrs. Davis, Haney & Miller.

About 75 to 100 men were employed thereon. The health of the employees was good, the sleeping and dining quarters clean and airy, and the food good, substantial and well cooked, the camp being in a high and dry location.

C. O'Gorman, M.D., was the medical officer who had charge of the employees and supervision of the camps, and his report thereon follows, viz.:

DEPOT HARBOUR, October 20, 1903.

Dear Sir,—Concerning the camps (breakwater) conducted by Messrs. Davis, Haney & Miller, contractors, I beg leave to state that as a camp it fully comes up to the requirements of the Public Health Act.

The sleeping arrangements are all that can be desired, well ventilated and cleanly kept. The dining rooms for the men and clerks are scrupulously clean, the food well cooked, and everything, owing to Mr. Moffat, the caterer's supervision, is done for the wants and comfort of the men.

The buildings are situated, as you are aware, in a most healthy locality, on a high rocky point, no stagnant water around, and the drinking water obtained from the Georgian Bay.

There has been little or no sickness among the men, beyond slight ailments. The average number of men at this camp is about 60, and at the Quarry camp, about 6 miles across the water, 20 to 25 men are engaged, and have good clean quarters to eat and sleep in.

It is my opinion that the contractors look after their men well as regards board and lodging, thereby fulfilling all requirements of the Public Works (Health) Act.

Only two accidents have occurred during the season.

I remain, dear sir,
Yours truly,
CONSTANTINE O'GORMAN, *M.D.*

In closing this, my annual report for the past twelve months, it is a great pleasure to be able to draw your attention to the apparently steady improvement from year to year in the general healthfulness and condition of all employees on public works, which, together with the fact that there was virtually no outbreak of contagious disease on the said works during the past season, is in my humble opinion somewhat of a fair proof that the passing of the Act 62-63 Vic., Chap. 30, intituled 'An Act for the preservation of health on public works,' was a beneficial piece of legislation, not only to contractors and others carrying on such works, but to the thousands of labouring men employed on the many various public works throughout the Dominion.

I have the honour to be, sir,
Your obedient servant,
CHAS. A. L. FISHER,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

# HEALTH OF ANIMALS.

## No. 15.

## REPORT OF J. G. RUTHERFORD, V.S., CHIEF VETERINARY INSPECTOR.

OTTAWA. October 31, 1903.

SIR,—I have the honour to present my annual report as Chief Veterinary Inspector for the Dominion.

During the year just passed my time has been very fully occupied, as in addition to carrying on the ordinary executive work of the branch I have found it necessary to devote considerable attention to the reorganization of some of its features, and have also, owing to unavoidable circumstances detailed elsewhere. been compelled to undertake a good many rapid journeys to different parts of the Dominion.

The rapid development which has characterized all branches of Canadian industry during recent years has very noticeably affected the live stock interests of the country.

The marvellous increase in the numbers and value of our flocks and herds has added in a corresponding degree to the duties and responsibilities of this branch of your department, to which is entrusted the important duty of guarding against those contagious diseases which threaten the prosperity of owners of live stock.

The field is a wide one, and while I hope to be able to show you that some progress has been made in the organization and systematization of our work, I must also endeavour to impress upon you the need for further development of the machinery required for the successful control and eradication of those maladies which endanger one of the greatest sources of our national wealth.

It is easy to underestimate the importance of such a branch of the public service as that under my supervision, for the reason that so long as its work is fairly well done it attracts. in the very nature of things. but little attention. It is only when some destructive disease has obtained a foothold among the live stock of a comtry that the public realizes to what an extent it is dependent upon the organization controlling such matters. Fortunately for all concerned. the year just passed has not been noted for any very serious or wide-spread outbreak of disease in the Dominion. although it looked at one time as if we were about to be visited by one of the worst bovine scourges of modern times, namely, Foot and Mouth disease. I think it may be reasonably claimed that the prompt and thorough measures adopted by this branch of your department were, to a great extent, effective in warding off the threatened danger. This subject is specially dealt with on page 167.

In the work of organization above referred to. the following steps have been taken during the year:—

The Biological Laboratory erected last year at the Experimental Farm has been completed and equipped under the personal supervision of Dr. C. H. Higgins, your pathologist. This establishment is now in working order. at least to such an extent as is possible without stabling and other accommodations suitable for experimental work on the ordinary domestic animals. Owing to the lack of facilities mentioned, it is necessary at present to use only the smaller animals as subjects for experiment.

Much valuable work is now done at this laboratory, not only in scientific research but also in the examination of pathological specimens sent in by our officers and others throughout the country. In this way it is often possible to decide definitely and promptly as to the nature of outbreaks which cannot readily be diagnosed by ordinary methods.

Some progress has been made in the manufacture of mallein and tuberculin, and this work is likely to be profitably extended in the near future, as it is my intention, with your approval, to arrange with Dr. Salmon, Chief of the Bureau of Animal Industry, to allow Dr. Higgins an opportunity of familiarizing himself with the methods pursued in the laboratories at Washington, where large quantities of the preparations alluded to, as well as of the various prophylactic vaccines, are now manufactured for distribution among the farmers of the United States. With the experience thus gained, Dr. Higgins will be in a position to carry on a similar work here, at an expense but slightly exceeding that now involved in the maintenance of the laboratory, while the greatly reduced cost at which these various preparations, now largely used, can then be supplied to stock owners, will far more than balance the increased outlay.

Dr. Higgins has furnished a very interesting and valuable report of his work, which will be found at page 93.

The experience gained during last summer convinced me that the Animal Contagious Diseases Act was somewhat unwieldy and out of date, and that it might with advantage be simplified and rendered more workable. I therefore, with your approval, drafted a new bill, in which a considerable number of changes were embodied. Many of these amendments, though apparently slight in themselves, are very important from an executive point of view, and will, I think, be found of great assistance in the work of the branch. The Bill was introduced early in the session, and after full discussion and amendment in both Houses of Parliament it received the Royal assent, and became law on August 13. New regulations in conformity with its provisions are in course of preparation and will shortly be issued. Meanwhile those passed in 1897 under the authority of the measure now repealed, continue in force.

The work performed by the regular inspectors of the branch, has been, with few exceptions, of a very satisfactory nature.

At headquarters I have received most valuable assistance from Dr. Moore, who has done a great deal of travelling, and who can always be relied on to execute the often difficult duties assigned to him in an efficient and tactful manner.

During the year several other officers spent short periods at head office and in the laboratory.

Among these may be mentioned Dr. Hopkins, who, during the season of 1902, performed the duties of veterinary quarantine officer in Britain. Owing to the change effected last winter in the method of testing imported cattle his services were no longer required in that capacity, and he was for some six months on the regular staff, with headquarters here. In May last he was transferred to Vancouver, B.C., and placed in general charge of the work of the branch in that province. Since his arrival there he has succeeded in systematizing the methods of stock inspection and generally improving the tone of our work on the coast.

Dr. Perdue, of Kingsville, who, as may be remembered, was some years ago, instrumental in stamping out hog cholera in Essex, has been transferred to Chatham, where he has been given full charge of the work of dealing with the serious outbreak of that disease in Kent county. A number of our other officers, among whom may be specially mentioned Dr. Orchard of Windsor, have also been employed in this field. While the disease still prevails to a considerable extent in the country immediately surrounding Chatham, I am satisfied that the businesslike, official methods introduced by Dr. Perdue are having an excellent effect, and will in the near future result in its complete eradication from the district.

Dr. Pethick, who has for a number of years been in charge of the work of this branch in Prince Edward Island, has been transferred to Antigonish, N.S., where, in addition to other duties, he is superintending the experiments now being carried on there with a view to discovering the cause of Pictou cattle disease. His selection for this task is due to his commendable zeal in endeavouring to collect information regarding this peculiar disease, which has hitherto baffled all efforts to determine its true nature.

The number of animals passing through the Toronto cattle market and the Union stock yards at Toronto Junction is now very large, and in view of the possibility of disease spreading in this way, Dr. Stork, one of our officers, has during the last year been in attendance each market day, armed with authority to take action in the event of any animals showing suspicious symptoms being presented for sale. This officer reports regularly to the department, furnishing a statement of the numbers of animals passing through the market, together with any other details which he deems it advisable to mention. It is, of course, distinctly understood that it is no part of his duty to carry out the provisions of the Ontario Public Health Act, the administration of which is in the hands of the provincial authorities.

For some years past the work of this branch in the North-west Territories has been performed in a most satisfactory manner by the veterinary officers of the North-west Mounted Police, supplemented by one regular inspector, Dr. Hargrave, of Medicine Hat. Owing to the large influx of settlers and the greater demands made on the services of the police, it has been found necessary to inaugurate a new arrangement. Under the plan now adopted, the police force maintains one inspector and eight veterinary staff sergeants, whose services are, as heretofore, at the disposal of this department, while for each additional veterinary staff sergeant employed, an allowance of $2 per day is made to the force from the funds at the disposal of this branch. There are now six of these extra officers on the strength, and the Commissioner considers that this number will prove sufficient for some time to come. The annual allowance paid by this branch to each of these fourteen officers has been increased to $200, while small grants are also made to the Commissioner, the Assistant Commissioner and Inspector Burnett, the chief veterinary officer of the force. Owing to the excellent system under which the work is carried on by these officers, and their facilities as regards transportation, to say nothing of their knowledge of the country and its conditions, the work of controlling contagious diseases of animals is performed much more economically and effectively than would be possible under any other arrangement.

I may add that the system has been extended to Yukon Territory, one of the veterinary staff sergeants mentioned above being now stationed at Dawson City, where, unfortunately, an outbreak of glanders took place last winter.

Since the opening of the Yukon Territory a large number of cattle and sheep for slaughter have been, each season, shipped to that district from Vancouver via Skagway. These animals, owing to the fact that they were carried on vessels clearing for a foreign port, were, I found, being treated as export stock; that is to say, they were being inspected before shipment. This I considered a needless burden on a trade already too expensive, especially as a further irregularity existed in the charging of fees for such inspections. I therefore took the matter up with the United States authorities, who, after some correspondence, granted my request that Canadian live cattle should be allowed to pass in bond, without inspection or the production of health certificates, over the strip of American territory lying between Skagway and the international boundary.

This is no more than reasonable, the shipments being really made from one part of the Dominion to another, although, unfortunately, compelled by circumstances to be landed at a foreign seaport.

The detail work inseparable from the reorganization of this branch, a task, as may be easily seen, yet far from complete, has, during the year, largely occupied my attention. In addition to the legislation previously referred to, many new forms for the use of inspectors have been prepared and distributed. The changed regulations have also necessitated an extensive correspondence, which has made heavy demands on my time. For these reasons I have not found it possible to travel as much as I otherwise would have done. I have, however, endeavoured to visit all points where local matters demanded my personal attention.

I hope in the future to be able to arrange matters as to give me greater freedom to visit the various districts where our officers are located, and thus to keep in closer personal touch with the actual conditions under which their work is performed than has hitherto been practicable.

I now beg to offer brief statements in detail of the work done by the branch in connection with the various diseases dealt with during the year.

### HOG CHOLERA.

Hog cholera has, I regret to say, continued to prevail to a somewhat serious extent in the county of Kent, Ontario, and to a less degree in the adjoining counties of Essex and Lambton. Minor outbreaks have also occurred in other parts of the Dominion, but these were, in most cases, directly traceable to hogs shipped from those portions of the district above mentioned, which it had not been deemed absolutely necessary to place under close quarantine. It is found, however, that such isolated outbreaks are comparatively easy to deal with, and that by the immediate adoption of stringent measures the disease can usually be stamped out without serious loss. Our experience in the infected area above mentioned has been of a less encouraging nature, and the outbreak mentioned in my last report as affecting a considerable portion of Kent still persists, though to a less serious extent.

As stated in my report of last year, an order was issued on October 22, 1902, forbidding entirely the movement of live hogs into, within or out of an area comprising the townships of Tilbury East, Raleigh, Dover East and West, Chatham, Harwich and Camden. As only a few outbreaks had occurred in Camden, I decided to make a farm to farm inspection of the hogs in that township as soon as the setting in of winter had checked the disease and set our inspectors at liberty for the work. A careful investigation having failed to bring to light any cases of the disease, an order was issued on November 29, 1902, releasing Camden from the restrictions above referred to. I am pleased to say that this action has been justified by the results, one small outbreak only having occurred in this township during the present season.

The restrictions against the shipment of live hogs from the other townships mentioned were maintained until April 3 of this year, when owing to the advent of warm weather it became impracticable to ship dressed pork.

A new order was therefore issued permitting the shipment from a number of specified points within the quarantined area of live hogs consigned direct to packing houses and slaughter houses. Each shipment had to be accompanied by a certificate from one of our regular inspectors, stating that the hogs composing it were free from disease and in every way fit for immediate slaughter.

The latter provision was inserted to prevent the shipment of small and light hogs, which under ordinary conditions of the trade are not accepted by the packers, and, being resold to farmers, are frequently instrumental in causing outbreaks of disease. The order also provided for the cleansing and disinfection of all cars used in the conveyance of hogs from the quarantined area after being unloaded and before being again used for the conveyance of animals or other articles.

Considerable difficulty was experienced in inducing some of the railway companies to carry out that part of the order relating to the cleansing and disinfection of cars. By having a duplicate copy of each certificate sent in promptly by the inspector, I was enabled to check up most of the cars and insist on their being properly dealt with. I may say that as the season advanced and the railway companies became convinced that the department intended to insist on their complying with the order, the difficulty experienced in getting the cars cleaned became greatly less. Much correspondence and many official inspections were necessary before this condition was brought about, and even yet the methods of the companies are capable of great improvement.

In all other respects the order of April 3 was strictly carried out, with the result that there was a marked diminution in the number of outbreaks of hog cholera in other parts of the country. This improvement was especially noticeable in the districts immediately tributary to the large pork packing establishments, from which formerly a number of hogs, rejected as being too light for slaughter, were distributed among farmers for feeding purposes.

One serious outbreak of hog cholera, however, occurred in the counties of Huron and Bruce early last summer. In this case the disease was traced to a carload of hogs shipped from Belle River in the county of Essex. This district was not in quarantine, and none of our officers were aware of the existence of hog cholera there. Inquiry, however, elicited the information that an outbreak of the disease involving several farms had taken place in the early spring. The facts had not been reported, with the result that the hogs purchased in the neighbourhood conveyed the infection to Huron and Bruce, and as above stated, caused the disastrous outbreak there. This incident is illustrative of the difficulties encountered in dealing with contagious diseases of animals, and shows how the best efforts of the authorities may at times be thwarted by the ignorance or cupidity of owners. Apart from this case, no really serious outbreak has taken place, although the disease has from time to time made its appearance in different localities.

On the whole, the method adopted, as above outlined, for regulating and controlling the shipment of live hogs from infected areas, appears to be productive of satisfactory results.

In the quarantined district itself the disease began to make its appearance more frequently as the summer drew to a close, and as a considerable number of outbreaks were reported during September and October, I deemed it advisable to again stop the movement of live hogs. An order to that effect was therefore issued on October 26, and will come into force on November 1. Every endeavour has been made to render the work of our inspectors dealing with the disease in the quarantined area as thorough and effective as possible, and I may say that a much better spirit appears to prevail among those interested in the hog industry than was the case when we began active operations among them.

It is my intention, with your approval, to keep the infected area under close restrictions, and to deal in the same way with any portions of the adjoining territory in which the disease becomes so prevalent as to render the movement of hogs therefrom a source of danger to the rest of the country. I am convinced that by dealing with the matter on strictly business principles, and insisting on the systematic carrying out of all orders issued by this department, either to its own officers or to the public, the disease can eventually be eradicated, provided fresh infection is not introduced.

I regret to say that many farmers seem inclined to conceal the existence of the disease, and to treat their sick hogs with one or other of the so-called hog cholera cures which are largely advertised by American empirics. Some encouragement is afforded to this line of conduct by the fact that the disease has varying degrees of virulence, and that hogs not unfrequently appear to recover from even comparatively severe attacks. This fact is taken advantage of by the vendors of these so-called remedies, and the farmer is told that he can cure his hogs instead of having them slaughtered, as will be the case if he reports to the proper authorities. As a rule, the farmer who adopts this method of dealing with the disease becomes a heavy loser, and eventually reports to our inspectors, but by that time much mischief has resulted from the disease being allowed to go on unchecked, perhaps for a considerable time. It has never been contended by any authority that hog cholera is an invariably fatal disease, but, on the other hand, it is well known that one of the most frequent causes of its spread is the transfer of one or more of these so-called 'cured' hogs from one district to another. So far as is at present known, the only safe mode of dealing with hog cholera is to slaughter all the animals in the infected herd, whether they show any signs of disease or not.

Having in mind the possibility of the introduction of fresh infection by transit hogs passing through Canada from the western states to Buffalo and other eastern points, I have paid during the past season a good deal of attention to the cleansing and disinfection of cars entering Canada at Windsor and Sarnia. Owing, however, to the peculiar conditions inseparable from this trade, it is impossible to effectually safeguard it, and it is, in my opinion, questionable whether the department would not be justified in forbidding the shipment of these American hogs through Canadian territory.

I may add that the conditions under which the hog industry is maintained in the south-western counties of Ontario are exceedingly favourable to the development and spread of the disease. The staple crop in the district referred to being corn and the climate being comparatively mild, large numbers of hogs are allowed to run at large during the greater part of the year. In this way the disease is easily spread from farm to farm by contact, with the result that whole districts have become infected. The sanitary conditions, also, under which hogs are kept, are, in most cases, exceedingly unsatisfactory, while except when performed under the supervision of our own inspectors, the work of disposing of dead animals and debris is grossly neglected. As elsewhere stated, several of our regular salaried officers have been drafted into the affected district, with instructions to devote any time which they are able to spare from the active performance of their duties of inspection to the carrying on of a campaign of education among owners and others interested in the hog industry.

The matter is one not easy to deal with in a manner satisfactory to all concerned, but, while consideration ought certainly to be shown to those suffering actual loss, we must not neglect the interests of the hog owners throughout the rest of the Dominion, and, this being the case, I would strongly recommend the maintenance of firm restrictions on the movement of hogs out of infected areas.

A peculiar outbreak of hog cholera took place during last winter, in the neighbourhood of Grand Pabos, on the Gaspé peninsula. In this case, the disease was attributed to hogs running on the fore-shore, having come in contact with the carcasses of swine evidently thrown over-board from passing steamers. While, taking all the circumstances into consideration, it is difficult to accept this theory as to the appearance of the disease in this remote district, it must be admitted that no other possible source of infection was discoverable. The disease was eradicated with comparatively trifling loss, and no recurrence has, so far, taken place.

Isolated outbreaks also occurred at Montreal, Que., Three Rivers, Que., Greenwood, B.C., and Victoria, B.C., but in these cases few animals were affected, and no difficulty was experienced in stamping out the disease.

An interim report issued only last month by Drs. De Schweinitz and Dorset, of the Bio-chemic Division of the U. S. Bureau of Animal Industry, contains the interesting statement that a form of hog cholera which prevails in south-western Iowa has been shown to be due to some unknown organism other than the bacillus generally credited with being the causative agent of the disease.

The malady in question resembles closely the acute form of hog cholera, not only in symptoms, general history and postmortem appearances, but in the facts that it is highly infectious for hogs only, and can be stamped out by the adoption of the measures successfully employed in dealing with the former affection.

The disease is easily transmissible from one hog to another by subcutaneous inoculation with certain body fluids, the freedom of which from the presence of the bacilli of either hog cholera or swine plague has been demonstrated beyond question.

An interesting feature of the experiments consists in the fact that all the animals infected in this way develop acute hog cholera, no chronic cases whatever having resulted from the inoculation. This circumstance leads the investigators to suspect that in all outbreaks of acute hog cholera there is some other agent besides the hog cholera bacilli at work, and that in acute cases where the bacillus is present there is a mixed infection by the latter and the organisms responsible for this newly discovered form of the disease.

This view is strengthened by the fact that the investigators have succeeded in isolating virulent hog cholera bacilli from hogs in which the disease had been produced by inoculation with infective material in which the absence of the bacilli had been conclusively proved.

This preliminary report affords good ground for the hope that our American friends are on the eve of a discovery, which may be of such importance as to revolutionize present methods of combatting this troublesome disease.

The early publication of further details is promised, and will be awaited with anxiety by all those interested in the hog industry.

The following statement shows the counties, townships and districts in which hog cholera occurred during the past twelve months, as also the number of farms quarantined:—

NUMBER of Farms Quarantined for Hog Cholera, Twelve Months ended October 31, 1903.

| Province. | County or District. | Township. | No. of Farms. |
|---|---|---|---|
| Ontario | Bruce | Huron | 5 |
| " | Elgin | Dunwich | 1 |
| " | Essex | Mersey | 7 |
| " | " | Rochester | 3 |
| " | " | Sandwich East | 5 |
| " | " | Sandwich West | 3 |
| " | " | Tilbury West and North | 30 |
| " | Huron | Ashfield | 1 |
| " | Kent | Camden | 1 |
| " | " | Camden Gore | 1 |
| " | " | Chatham | 37 |
| " | " | Chatham Gore | 13 |
| " | " | Dover | 60 |
| " | " | Harwich | 108 |
| " | " | Howard | 1 |
| " | " | Raleigh | 9 |
| " | " | Romney | 1 |
| " | " | Tilbury East | 23 |
| " | Lambton | Sombra | 5 |
| " | Middlesex | Adelaide | 1 |
| " | Wellington | Eramosa | 1 |
| " | " | Garafraxa | 1 |
| " | Collingwood district | | 2 |
| " | Niagara " | | 7 |
| " | Sault Ste. Marie district | | 5 |
| " | Sudbury " | | 6 |
| " | Toronto " | | 7 |
| Quebec | Gaspé | Pabos | 8 |
| " | Three Rivers | | 1 |
| " | Montreal | | 1 |
| British Columbia | | | 6 |
| | Total | | 360 |

## TUBERCULOSIS.

Recent investigations have demonstrated that a considerable period, viz., from eight to fifty days, elapses between the date of infection with tuberculosis and the time when it is possible to obtain a reaction to the tuberculin test.

This fact, taken in conjunction with our experience, in 1901 and 1902, of the doubtful methods used to evade the test by some British breeders, led me last winter to recommend to you the discontinuance of the official testing in Europe of cattle intended for export to Canada, and the adoption instead of the plan of testing such animals after their arrival in the Canadian quarantine. With your approval therefore, and I may add with that of the executive committee of the Dominion Cattle Breeders' Association, all cattle now imported from Canada to Europe are tested after they have been sufficiently long in quarantine to settle down and become accustomed to their surroundings. The test is made under such conditions as ensure fair play to the animals and their owners, as well as to the officer entrusted with the work. Animals which react, but do not show clinical symptoms, are permanently ear-marked and listed, and may then be removed at the expiry of the usual period of quarantine without further restrictions, save that they must at no time be offered for export to the United States, so long as the regulations, at present maintained by that country, continue in force.

Canadian cattle reacting to tuberculin when tested for export or otherwise are treated in a similar manner. Some difficulty was experienced in obtaining a satisfactory permanent ear-mark, and it was only after considerable experimentation that the present instrument was evolved. The mark finally decided on is a large 'T,' cut clean out of the right ear; a small notch in the margin of the same ear is also added to denote the year in which the test is made.

While this method of dealing with reacting cattle may evoke some criticism, I am satisfied that under existing conditions of knowledge and sentiment *re* bovine tuberculosis, it is the most sensible solution of the problem which confronts those charged with the task of controlling the disease.

The slaughter of a few animals now and then, simply because circumstances lead to their being tested with and reacting to tuberculin, can be of but little avail, while the enormous expense and stupendous labour involved in attempting wholesale measures of testing and slaughter throughout the Dominion render the adoption of such a scheme utterly impracticable even if there were, as there is not, a reasonable certainty, that it would achieve the desired end.

Bovine tuberculosis can only be stamped out when individual owners realize that it pays much better to keep sound cattle than to lose money and feed in maintaining herds tainted with disease. Even those who are so unfortunate as to have affected cattle, can, by adopting intelligent methods in dealing with the young stock, succeed in eliminating the disease within a comparative short period.

It is simply a matter of popular education, and I am convinced that the ear-marked cattle will be an important factor in teaching the needed lesson.

While on this subject, I desire to draw your attention to the excellent papers on Bovine Tuberculosis read by Dr. Salmon and Senator Edwards before the American Veterinary Medical Association on the occasion of their recent visit to Ottawa, a brief account of which may be found at pages 154 and 161.

During the year there were tested for export to the United States 634 head of Canadian cattle, of which number 28 reacted, the others all passing in a satisfactory manner. Of those imported from Europe and tested in quarantine, 71 in number, 11 reacted, and were ear-marked and listed.

Of other cattle there were tested 713, of which 69 were found to react.

With reference to these latter animals, it should be borne in mind that the herds to which they belongd were in almost every case strongly suspected of being diseased, this being in fact the reason for their being tested.

### GLANDERS.

I regret to have to report that it has been necessary, during the past year, to deal with a large number of cases of glanders. The disease has, as usual, prevailed to a greater extent in the North-west Territories than elsewhere in the Dominion, 219 horses having been destroyed there during the year. This is a considerable increase over previous years, but it must be borne in mind that the number of horses in the North-west Territories has increased very largely of late, and further, that owing to the additional number of inspectors employed, and the fact that all contact horses even when showing no clinical symptoms, are now tested and carefully looked after, there is more likelihood than formerly of such cases being detected and finally destroyed.

The serious outbreak discovered in the Ottawa district in August, 1902, has claimed a great deal of attention, and largely occupied the time of several of our officers. A number of minor outbreaks have also been dealt with in Ontario and Quebec, while several cases have occurred in British Columbia.

The disease made its appearance in the Yukon Territory during the winter months, and a considerable number of horses have been destroyed by the territorial authorities.

Three hundred and thirteen horses have been killed during the year by our officers, while a very large number of contact animals have been submitted to the mallein test and dealt with on the system outlined in my report of last year.

Briefly stated, this system is as follows: All horses which have been in contact with a palpably affected case of glanders, and which react to the mallein test, are ordered to be isolated, so far as stabling is concerned, from all other horses which have not so reacted. They are not allowed to be stabled on any premises except those of the owner which are definitely described in the order served upon him. They must not be sold or otherwise disposed of, and they must be available at any and all times for inspection by the officers of the department. In order to ensure identification and prevent fraud, these reacting horses are branded on the hoof with the letters 'E.R.,' and in case of the reported death of the animal, the owner is required to produce the hoof bearing the brand. At the expiry of forty days the animals are retested, and those which cease to react are released from all restrictions, except that they must not be sold or otherwise disposed of, while those which continue to react are kept under the same restrictions as formerly. Sixty days afterwards they are again submitted to the test, and if they then react without showing definite improvement their destruction is ordered, while on the other hand if they become ceased reactors they are dealt with in the same way as those which ceased to react at the second test. Any animal developing clinical symptoms of the disease at any time after the first test is, of course, killed as soon as possible. Where definite improvement is shown at the third test a fourth test is sometimes ordered. During the year 1,062 horses have been tested, of which 466 reacted. 64 have ceased to react, and some few of these have been entirely discharged from supervision, while the remainder are still kept under the control of the department. It is needless to say that this system entails a very great deal of arduous work among those officers of this branch who are engaged in carrying it out, but I am convinced that it is by far the safest and most satisfactory way of dealing with horses which have been in contact with glanders.

I would, however, strongly recommend that some compensation should be paid to owners of horses slaughtered after reacting to the third test, so long as they show no clinical symptoms of the disease.

While there may be a question as to the necessity, or even the wisdom, of paying compensation for horses killed when clinically affected, such animals being highly dangerous not only to other horses but also to human beings, I cannot but recognize the hardship of destroying without compensation animals showing no external symptoms of the disease, and to all appearance quite healthy, although continuing to react to mallein. It is very important that such horses should not be lost sight of, nor allowed to drift into the ordinary channels of trade, and I think it would be less expensive to the department to pay a reasonable compensation and have them killed, than to keep them under supervision and retest them from time to time. In this connection I would say that numerous experiments conducted by the British Board of Agriculture and other European authorities have shown that there is no danger of infection from ceased reacters, and that reacters not showing clinical symptoms are not infective. The great danger, so far as the latter class of animals is concerned, lies in the possibility of the disease becoming acute under conditions favourable to its development, and this of course puts the release of such horses from supervision entirely out of the question. The experience of all other countries goes to show that the payment of reasonable compensation for animals destroyed is one of the strongest inducements to owners to report outbreaks of disease to the proper authorities.

So far as the returns for Ontario are concerned, I would beg to remind you that until August, 1902, this department did not deal with glanders in the province named, the matter having, up till that time, been left in the hands of the provincial authorities, who had no adequate machinery for carrying out proper measures for the suppression of the disease. Below is a statement giving a list of the various outbreaks, with their locations and the number of horses involved.

The figures do not include Manitoba, where glanders is dealt with by the provincial authorities, nor the Yukon, where, up to the present, the work has been in the hands of the territorial government, although an arrangement has now been consummated by which the veterinary officers of the North-west Mounted Police will act for this department there as they do in the other North-west Territories.

### *Province of Ontario.*

| | No. of horses destroyed. |
|---|---|
| Ottawa city and vicinity | 37 |
| Renfrew | 9 |
| Nipissing | 4 |
| Prescott | 1 |
| Essex | 8 |
| Oxford | 5 |
| Wellington | 1 |
| Grey | 3 |
| Ontario | 1 |
| Total | 69 |

### *Province of Quebec.*

| | |
|---|---|
| Quebec city and vicinity | 5 |
| Megantic | 4 |
| Bellechasse | 2 |
| Champlain | 2 |
| Arthabaska | 1 |
| Wright | 9 |
| Total | 23 |

*North-west Territories.*

| | |
|---|---|
| Assiniboia East | 107 |
| Assiniboia West | 10 |
| Alberta | 77 |
| Saskatchewan | 25 |
| Total | 219 |
| *British Columbia* | 2 |

### PICTOU CATTLE DISEASE.

No definite results having yet been obtained through pathological research as to the true nature and causes of Pictou cattle disease, a new departure has this year been made with a view to discovering, if possible, whether or not there is any foundation for the belief entertained by a majority of the people in the district where the disease prevails that it is caused directly or indirectly by the use as food of the ragwort (*Senecio Jacobea).*

Dr. Gilruth, pathologist to the government of New Zealand, is strongly of the opinion that this weed is the cause of the disease for the reason among others, that in that country, as in Nova Scotia, the area in which the weed is found is, generally speaking, co-terminous with that in which the disease prevails. A striking corroboration of this theory was furnished during the past summer, when a number of animals having died in the eastern part of Prince Edward Island, Dr. Pethick, on making investigation, found that they had succumbed to Pictou cattle disease, and at the same time discovered, to his surprise, that the district where the disease occurred was badly infested with ragwort.

With a view to putting to a definite test the theory of the connection between the weed and the disease, I, with your approval, decided to establish a station where feeding experiments could be conducted.

After visiting the maritime provinces, and investigating the condition of affairs both on the mainland and in Prince Edward Island, I selected for the purpose mentioned a farm of 200 acres at Cloverville, near the town of Antigonish, N.S., this being one of the districts in which the disease is prevalent.

The farm in question has been leased at a reasonable rental for a term of three years, with the privilege of extension if required. Additional buildings have been erected, and 34 cattle are being purchased. These will be divided into two main lots of 16 each, while the other two head will be utilized for a special experiment. Sixteen of these animals will be fed during the winter on hay grown outside of the diseased area, and therefore containing no ragwort; sixteen others will be fed on the ordinary hay of the district, in which a considerable quantity of ragwort is found. These two lots are to be subdivided into smaller lots of four. One of these lots will receive a comparatively heavy grain ration in addition to hay; one a very moderate ration; one a limited allowance of hay only, and one a liberal allowance of hay alone. In the special class one animal is to be fed on ragwort with which will be mixed a little hay, while the other is to be fed on straw and bran only.

A number of subsidiary experiments will also be carried on with a view to determining whether or not the disease is transmissible from one animal to another, for although it has been dealt with for many years as a contagious disease I am strongly of the opinion that it does not belong to this category.

Dr. Pethick has been transferred from Central Bedeque, P.E.I., to Antigonish, N.S., so that he may be able to take charge of the station, and carry on the experiments in a careful and systematic manner. It is the intention to continue these experiments for several years, in the hope of being able to demonstrate the true nature and causes of the disease, so that intelligent means may be used for its control and eradication. A list of the cases dealt with by Dr. Townsend during the past season is appended to his report.

### ACTINOMYCOSIS.

Very few cases of this disease have, during the past year, been observed anywhere in the Dominion, and an exceedingly small number of export cattle have had to be rejected on account of being affected with it. No action is now taken regarding it by the department, beyond preventing the exportation of affected cattle.

### ACTINOBACILLOSIS.

I regret to say that one, or possibly two, cases of this recently discovered disease, to which your attention was first directed in my report of last year, have been detected in Canada. It is possible that a number of the lesions hitherto considered actinomycotic have been, in reality, due to manifestations of actinobacillosis.

Dr. Higgins is at present conducting a careful bacteriological investigation into the subject, to which he refers in his report at page 99.

It is my intention to issue a special report on the subject as soon as sufficient progress has been made to warrant its publication.

### ANTHRAX.

The Dominion has, during the past season, been remarkably free from outbreaks of anthrax, a very limited number of animals having been affected, as compared with previous years.

In cases where the disease was reported to the department in time, prompt action was taken with a view to preventing its spread. Vaccine was supplied to owners in districts where the disease was known to exist, 30 doses having been disposed of in this way, but no preventive inoculation was performed by our officers, it being thought better to leave this work in the hands of private practitioners.

A list of the outbreaks reported is appended.

| | |
|---|---|
| Cornwall, Ont. | 3 |
| North Lunenburg, Ont. | 1 |
| Cap St. Ignace, Que. | 1 |
| Stony Plains, Alta. | 1 |

### BLACK-QUARTER.

A notable decrease has taken place in the number of outbreaks of black-quarter reported, and the sales of blackleg vaccine have been correspondingly light. During the year 3,909 doses were supplied to applicants as follows:—

| | |
|---|---|
| Ontario | 487 |
| Quebec | 120 |
| North-west Territories | 3,302 |
| Total | 3,909 |

### MANGE IN CATTLE.

I am pleased to be able to state that this disease which has, for a number of years, been a serious menace to the grazing industry in Alberta and Assiniboia, appears to be yielding to the vigorous measures for its suppression adopted last year by individual owners. There is no doubt that the treatment by hand which is now in vogue is much more efficacious than the policy of dipping formerly followed. The latter, unless very thorough and frequently repeated, is seldom satisfactory, whereas the systematic application by hand of a suitable germicide appears to effectually destroy the acari. At the present time the disease has almost disappeared, but, following its usual course, it is likely to again develop to some extent during the winter season.

### MANGE IN HORSES.

As anticipated last year, mange in horses has proved somewhat troublesome in the North-west Territories, particularly in the High River district and in the neighbourhood of Medicine Hat. All cases detected have been promptly dealt with by our officers, and a large number of horses have been quarantined and treated.

The difficulty of entirely segregating animals running on the open range is, needless to say, considerable, and this renders the task of eradicating diseases of this nature an exceedingly arduous one.

Full reports from the officers dealing with this disease are appended.

### SHEEP SCAB.

Sheep scab has not prevailed to any serious extent during the past year, although a number of circumscribed outbreaks have been reported and dealt with.

The existence of the disease was detected last February in the vicinity of Sterling, Alta., two small flocks being affected. Prompt action resulted in its being completely stamped out, all the animals having been successfully treated, and afterwards slaughtered for food purposes.

In Ontario several outbreaks occurred during the year, of which perhaps the most serious was that scheduled below as having been dealt with in Haldimand county.

In this, one flock only was involved, although a considerable number of sheep were affected. The disease was traced to Victoria county, where it has been known to exist for several years.

In Wellington county a number of small flocks were found to be affected, but here the prompt measures adopted proved effective in eradicating the disease, without serious loss to owners.

I append a list of the outbreaks, showing the location of each, and the number of animals involved:—

| | | | | |
|---|---|---|---|---|
| Alberta.. .... .... .... .... .... | 2 | outbreaks; | 65 | sheep affected |
| Ontario— | | | | |
| Haldimand county.... .... .. | 1 | " | 203 | " |
| Wellington county.. .... .... .. | 11 | " | 168 | " |
| Welland county.... .... .... .. | 2 | " | 30 | " |
| Victoria county.... .... .... .. | 2 | " | 11 | " |

### SWAMP FEVER.

But little progress has been made this season in the investigation being conducted by Drs. Bell and Torrance into the nature and causes of the disease known as swamp fever. Fortunately for horse owners, there has been a marked diminution in the prevalence of the malady, and a consequent lack of material available for research work. A short report by Dr. Torrance, which may be found on page 152, gives the details of what little has been done.

Early in the season I, with your approval, arranged with Dr. Wolferstan Thomas, Fellow in Bacteriology of McGill University, who has had exceptional opportunities for the study of diseases due to Trypanosomata, to go to Winnipeg and take part in the investigation. His appointment to a position on the staff of the Liverpool School of Tropical Medicine prevented the carrying out of our intentions in this regard.

In view of the lack of material, it is perhaps as well that the expense involved in his engagement was not incurred.

### TYPHOID INFLUENZA.

Typhoid influenza which, for a number of years, has been known to exist in western Canada, has recently made its appearance among horses in various parts of Ontario. From several districts it has been reported to the department as a new and mysterious disease. Investigation, however, soon demonstrated its true nature, and the advice given by our officers when followed by local veterinarians has been largely instrumental in lowering the death rate.

### FOOT AND MOUTH DISEASE IN NEW ENGLAND.

On November 26, 1902, I learned, through a cable from the office of the High Commissioner in London, that the British Board of Agriculture had heard a rumour of the existence of Foot and Mouth disease in the neighbourhood of Boston, Massachusetts. Unwilling to give credence, without due inquiry, to a report of this nature, I immediately telegraphed to Dr. Salmon, Chief of the Bureau of Animal Industry at Washington, and to Dr. Austin Peters, Head of the State Cattle Bureau of Massachusetts. During the forenoon of November 27, I received telegrams from both of these gentlemen confirming the reports previously heard. Instructions were at once issued that all stock cars entering Canada, consigned either directly or indirectly, from the New England States, should be thoroughly cleansed and disinfected before being allowed to cross the international boundary. All cars in the railway yards at Montreal, en route from New England points, were also ordered to be cleansed and disinfected immediately. These orders, which I may say, went into effect and were acted upon at once by our officers in Montreal, were deemed of vital importance, because of the large numbers of cattle consigned from Canada for shipment to Britain via Boston and Portland. Cars conveying such cattle, if used, as they not unfrequently are, for local traffic in New England, might easily have conveyed the infection to many points in the Dominion, the disease being notorious for the rapidity with which it spreads along lines of transportation.

As you are aware, an Order in Council was passed, without delay, forbidding the entry into Canada from any of the New England States of cattle, sheep and other ruminants and swine, as also of their hides, horns and other similar products. The most stringent measures were adopted to ensure the effective carrying out of this order. Special officers were stationed at all points where railways crossed the boundary to see that the order was not infringed, and to superintend the cleansing and disinfection of all cars in any way likely to convey the disease. The services of a number of our regular inspectors were called into requisition, while one veterinarian, Dr. E. P. Ball, of Rock Island, Que., was specially appointed, and constantly patrolled the country along the boundary between the railway lines, watching, warning and generally instructing farmers and others as to the need for keeping a close guard against the entry of American stock.

These precautions were maintained without intermission until September 26, 1903, when, on the certainty of the disease having been completely stamped out by the energetic and thorough action of the United States Bureau of Animal Industry, an order was passed removing the restrictions, and allowing trade to resume its usual channels.

It is impossible to speak too highly of the work of the United States Bureau of Animal Industry in stamping out the outbreak in New England. Not content with following the methods usually adopted in dealing with Foot and Mouth disease, Dr. Salmon resolved to take the extreme but, by the results, fully justified step of slaughtering all infected herds. As the percentage of actual mortality from this malady is very small, the adoption of the slaughter system of eradication gave rise to considerable adverse criticism and to some opposition. There is now, however, no room for doubt that taking into consideration the magnitude of the interests at stake and the tremendous losses which would have resulted from the distribution of the disease over this continent, Dr. Salmon displayed true wisdom in deciding to stop the spread of the contagion by slaughtering each affected herd as soon as possible after the discovery of the disease among its members.

I may say that while the alarm was at its height, and indeed for some time after the danger was over, the existence of foot and mouth disease in Canada was frequently reported to this branch. All such reported outbreaks were carefully investigated, with the result, that in no single instance was the disease found to exist.

In view of the lack of practical knowledge of the malady which fortunately prevails among Canadian stock owners, it was thought advisable to issue a special bulletin on the subject, a copy of which is attached to this report.

I feel constrained to express my grateful appreciation of the courtesy shown to me by Dr. Salmon, Chief of the Bureau of Animal Industry, and by Dr. Bennett, his officer in charge at Boston, who promptly answered all inquiries, and kept me fully informed as to the conditions prevailing in the quarantined area.

## EXPORT INSPECTIONS.

Owing to the scheduling of the New England States by the British authorities which followed the appearance of foot and mouth disease in November, 1902, a much larger number of cattle have been shipped from Canadian ports than would have been the case under ordinary conditions. The correspondingly heavier duties which devolved upon our inspectors at these ports have been performed in an eminently satisfactory and thorough manner.

As an additional safeguard, in case of difficulty arising over any shipment, inspectors now furnish special reports for each lot of animals dealt with, giving details as to numbers and condition, as also names of owners and of the vessels on which the stock is loaded. This method renders it possible to trace back animals with greater facility than was formerly the case, while it also makes the inspector individually responsible for his work.

In this connection I may say that I do not consider the present method of marking export animals at all satisfactory, and that it is my intention, with your approval, to inaugurate in the near future a more effective system, whereby the identification, and if necessary the tracing, of each individual will be rendered comparatively easy.

In presenting the accompanying statement of the animals inspected by our officers during the year, I would point out that, owing to certain conditions, it does not constitute a complete record of the live stock exports of the Dominion. A considerable number of Canadian animals are exported to Great Britain via the United States, and these, being inspected at American seaports, are not, as a rule, recorded by our officers. I cannot regard this feature of our export trade as satisfactory, and would strongly recommend the adoption of a system whereby all Canadian stock consigned to countries other than the United States should be carefully inspected and marked by Canadian officers.

Again, a large number of animals are yearly exported from Canada to the United States which, as a result of the arrangement made by you with the American Secretary of Agriculture in 1897, are not inspected before shipment, and consequently do not appear in the records of this department.

TABLE showing animals inspected at the following ports.

| — | Cattle. | Horses. | Sheep. | Swine. |
|---|---|---|---|---|
| Montreal to Great Britain | 147,876 | 432 | 59,743 | ... |
| Montreal to South Africa | 305 | 64 | ... | ... |
| Quebec to Great Britain | 6,519 | ... | 2,227 | ... |
| Three Rivers to Great Britain | 152 | ... | ... | ... |
| St. John, N.B., to Great Britain | 31,646 | 99 | 13,267 | ... |
| " to United States | 25 | ... | ... | ... |
| Halifax to Great Britain | 4,014 | 17 | 426 | ... |
| " Bermuda | 15 | 60 | 736 | 3 |
| " West Indies | 11 | 18 | 709 | 5 |
| " Newfoundland | 3 | 1 | 17 | 7 |
| " United States | ... | 1 | ... | ... |
| Charlottetown to Great Britain | 47 | ... | 1,587 | ... |
| " Newfoundland | 1,084 | 57 | 2,072 | 64 |
| Victoria, B.C., to United States | ... | 17 | ... | 2 |
| Total | 191,697 | 766 | 80,784 | 81 |

Total animals exported from above ports, 273,328.

Of the above, 48,880 cattle and 2,924 sheep were from the United States, and 65 cattle were from Mexico.

Animals rejected at the following ports:—

|  | Cattle. | Horses, | Sheep. |
|---|---|---|---|
| Montreal | 280 | 4 | 134 |
| St. John, N.B. | 75 | — | 56 |
| Total | 355 | 4 | 190 |

Of the above, 7 cattle at Montreal and 5 at St. John were rejected for actinomycosis; the rest of the animals rejected were suffering from lameness or injuries received during transportation, but showed no indication of contagious or infectious disease.

## IMPORT INSPECTIONS.

### I.—From Europe.

| Port. | Cattle. | Horses. | Sheep. | Swine. | Goats. |
|---|---|---|---|---|---|
| Lévis quarantine, Quebec | 245 | ... | 231 | 124 | 93 |
| Montreal | ... | 288 | ... | ... | ... |
| St. John, N.B | 5 | 18 | 6 | ... | ... |
| Halifax | 9 | 3 | *6 | ... | ... |
| Charlottetown, P.E.I | ... | ... | *6 | ... | ... |
| Total | 259 | 309 | 243 | 124 | 93 |

* These sheep were inspected both at Halifax and Charlottetown.

### II.—From United States.

| Port. | Cattle. | Horses. | Sheep. | Swine. | Mules. |
|---|---|---|---|---|---|
| St. John, N.B. | .... | .... | 1 | .... | .... |
| Halifax | .... | 12 | .... | .... | .... |
| Charlottetown, P.E.I. | .... | 1 | .... | .... | .... |
| Niagara Falls, Ont | 127 | .... | 27 | 28 | .... |
| Point Edward, Ont | 41 | .... | 224 | 19 | .... |
| Windsor, Ont. | 36 | 16 | 1 | 6 | .... |
| Winnipeg, Man | 3,175 | 9,526 | 80 | 395 | 675 |
| Deloraine, Man | 408 | 427 | .... | 4 | 5 |
| Killarney, Man | 249 | 520 | 3 | 15 | 1 |
| Emerson, Man | 758 | 694 | 48 | 37 | 10 |
| Gretna, Man | 53 | 266 | .... | 9 | 19 |
| Crystal City and Snowflake, Man | 704 | 872 | 29 | 116 | 2 |
| North Portal, Assa | 23,969 | 12,240 | 139 | 559 | 388 |
| Maple Creek, Assa | 3,129 | 3,370 | 8,269 | .... | 21 |
| Medicine Hat, Assa | 73 | 3,430 | .... | .... | 6 |
| Wood Mountain, Assa | .... | 1,574 | .... | .... | .... |
| Coutts, Alta | 6,029 | 8,158 | 7,919 | 174 | 46 |
| Cardston, Alta | 6,089 | 3,578 | .... | .... | .... |
| Nelson, B.C | 101 | 925 | 4,656 | 10 | .... |
| Gateway, Cranbrook and Rykerts, B.C | 43 | 1,041 | .... | 1 | 1 |
| Victoria, B.C. | 54 | 90 | 335 | .... | 4 |
| Nanaimo, B.C | .... | .... | .... | .... | 25 |
| Total | 45,038 | 46,740 | 21,731 | 1,373 | 1,203 |

Horses brought from the United States are not, as a rule, subjected to inspection except when entering Manitoba, the North-west Territories and British Columbia.

### III.—From Mexico.

| Port. | Cattle. | Horses. | Sheep. | Swine. | Goats. |
|---|---|---|---|---|---|
| North Portal, Assa | 23,311 | 1,004 | .... | .... | 31 |
| Coutts, Alta | 942 | .... | .... | .... | .... |
| Toronto | .... | 200 | .... | .... | .... |
| Total | 24,253 | 1,204 | .... | .... | 31 |

### IV.—From Newfoundland.

| Port. | Cattle. | Horses. | Sheep. | Swine. | Goats. |
|---|---|---|---|---|---|
| Halifax | .... | 1 | .... | .... | .... |

### MEXICAN CATTLE.

I, last year, reported the importation to the North-west Territories of a considerable number of Mexican cattle. This trade has since developed to a much larger extent, the number of these cattle brought in during the past season having reached the enormous total of 24,253. As these animals originate south of the United States

Texas fever quarantine line, I decided, as soon as the first shipments were reported, that it would be necessary to take every possible precaution to prevent the introduction of the Texas fever tick, Boophilus Annulatus (bovis), as this parasite is the real source of danger, and the only agency by which, under ordinary conditions, the disease can be communicated from one animal to another.

Owing to our rigorous winter climate there is no danger of Texas fever obtaining a permanent foothold in the Dominion, but it is within the range of possibility that tick infested cattle entering the country during the summer months might be the means of introducing the disease, and of causing considerable loss before the first frost put a stop to its ravages.

As some anxiety in regard to this subject naturally exists among western cattle owners, I think it will be well to give a brief account of the safeguards now maintained against the introduction of the disease.

Bureau of Animal Industry Order No. 107 of date March 13, 1903, gives notice that a contagious and infectious disease known as splenetic, southern or Texas, fever exists among cattle in the district described below:—

'All that country lying south, or below, a line beginning at the north-west corner of the State of California; thence east, south and south-easterly along the boundary line of said State of California to the south-eastern corner of said state; thence southerly along the western boundary line of Arizona to the south-west corner of Arizona; thence along the southern boundary lines of Arizona and New Mexico to the south-eastern corner of New Mexico; thence northerly along the eastern boundary of New Mexico to the southern line of the State of Colorado; thence along the southern boundary lines of Colorado and Kansas to the south-eastern corner of Kansas; thence southerly along the western boundary line of Missouri to the south-western corner of Missouri; thence easterly along the southern boundary line of Missouri to the western boundary line of Dunklin county; thence southerly along the said western boundary to the south-western corner of Dunklin county; thence easterly along the southern boundary line of Missouri to the Mississippi river; thence northerly along the Mississippi river to the northern boundary line of Tennessee at the north-west corner of Lake county; thence easterly along said boundary line to the north-east corner of Henry county; thence in a northerly direction along the boundary of Tennessee to the north-west corner of Stewart county; thence in an easterly direction along the northern boundary of Tennessee to the south-western corner of Virginia; thence north-easterly along the western boundary line of Virginia to the northernmost point of Virginia; thence southerly along the eastern boundary line of Virginia to the north-east corner of Virginia, where it joins the south-eastern corner of Maryland at the Atlantic ocean.'

The above line is, however, subject to variations, inasmuch as quarantine regulations established by state authorities are not unfrequently adopted by the Secretary of Agriculture when he is satisfied that it is safe to follow this course. Cattle from that portion of the United States lying south of the quarantine line can, except in winter, be shipped north, east or west of the said line only for immediate slaughter, and then under special restrictions, from which the following may be quoted:—

They can only be unloaded for any purpose in pens or yards set apart for infected cattle, and kept separate and distinct from any chutes, pens and yards used by cattle originating outside of the quarantined area. All cars carrying cattle from the infected area bear printed placards stating that they contain southern cattle, and all waybills, conductor's manifests and bills of lading, of such shipments by cars or boats have a notation to the same effect plainly written or stamped upon them. Where cattle are reshipped from one point to another the same precautions are observed. No boat carrying cattle from the quarantined area is allowed to receive on board any cattle from outside thereof. No cattle from the infected district can be shipped to outside points unless proper facilities have been provided for transferring them to stock yards and slaughter houses, without passing over public highways. Exception is made to this rule, however, where permission for such passage is first obtained from the local authorities. All cars and boats, chutes, alleys and pens used by these cattle during transportation at points of destination must be thoroughly disinfected, and no cars which have carried such cattle are allowed to be again used until after they have been thoroughly cleansed and disinfected.

The above regulations are strictly observed from February 1 to October 31, but cattle from the quarantined district to outside points may be shipped without inspection during November, December and January. So far, therefore, as cattle from that portion of the United States south of the quarantine line are concerned, there is evidently no risk to be apprehended, as such animals are not allowed to be shipped north at all during the dangerous season, except for the purpose of immediate slaughter.

The following is the rule observed by the United States government as to the introduction of cattle from Mexico:—

'Cattle from the Republic of Mexico may be admitted into the United States, after inspection according to law, as follows: Cattle free from splenetic, or Texas, fever, and from contact therewith during the six months preceding such inspection, and which have been grazed in a locality free from infection of such fever, may be admitted into any part of the United States. If destined to points in the non-infected area, a special permit must be obtained from an inspector of the Bureau of Animal Industry, said permit being issued according to the regulations of said bureau. The cattle for which said permit is issued must not be driven through the infected area, nor be unloaded in any part thereof except at such a point as may be duly designated by an order issued by this department. If shipped in infected cars or unloaded in the infected area, except as above stated, they will be subject to the regulations concerning infectious cattle.'

It is thus plainly evident that the United States government considers certain parts of the Republic of Mexico to be free from the infection of Texas fever, inasmuch as they authorize the admission of cattle from such localities into any part of the United States under certain conditions, which conditions, I may say, apply with equal force in the case of cattle shipped in bond to Canada as to those consigned to the northern states for grazing purposes.

In addition to the above mentioned certificate from the United States Bureau of Animal Industry, on the production of which I insist, special precautions have been adopted during the last two seasons whereby these cattle from Mexico are subjected to a rigid inspection before being allowed to enter the Dominion.

Owing to lack of proper yard accommodation at North Portal, a veterinary surgeon is now stationed, during the shipping season, at Velva, N.D., a divisional point about 100 miles south of the international boundary. In June last this officer reported having discovered a number of ticks on a trainload of cattle consigned to Stair, Assa. He was instructed to hold the cattle, and send forward immediately specimen ticks for identification. This was done, but before the specimens, which proved to be the Ornithodoros Meginini, and therefore harmless, were received here, a communication came to hand from Dr. Salmon, stating that a large shipment of Mexican cattle were being held at El Paso, owing to the discovery that a number of them were badly infested with the Boophilus Annulatus, the specific tick of Texas fever.

Dr. Salmon also reported that one trainload had unfortunately been allowed to go forward, and was now, as far as he could learn, in Canada. The remainder of the cattle were held at El Paso for treatment, most of them being eventually sent forward. Considerable difficulty was experienced in locating the trainload of cattle referred to as having reached Canada, but they were eventually identified, and, although they had been duly inspected without any ticks being detected, they were held on an isolated range, sufficiently long, to give assurance that no outbreak of the disease was going to follow their importation.

The remaining cattle were held at El Paso, and after treatment and careful inspection were granted certificates and allowed to proceed. Our officer at Velva made a careful examination, but was only able to find one Texas fever tick in the whole shipment.

The explanation given by Dr. Salmon was that these cattle, which originated in Coahuila, Mexico, were free from disease when inspected at the boundary, but that on being driven through western Texas to the railway they became infected, the presence of the ticks being detected on a second inspection at El Paso.

The incident, however, indicates that in spite of all precautions the introduction to Canada of tick infested cattle is within the range of possibility.

That there is justification for the adoption of a policy of watchfulness is shown by the following quotation from Dr. Salmon's letter:—

'There must always be more or less suspicion with reference to Mexican cattle, for the reason that there are no regulations enforced there preventing the driving of infected animals to any part of the country, so far as I am informed; and while Chihuahua may be entirely free to-day, it might be infected within a week, and cattle driven across infected trails might acquire small ticks which would develop later. The inspection, therefore, can not be considered as absolutely certain, although we have had no trouble develop with any cattle.'

In consideration of the facts here stated, and of the large interests involved, I cannot but recommend the maintenance of special precautions as regards this new development of our stocker trade.

The best guarantee of immunity would, unquestionably, be the confining of the importation of Mexican cattle to a period of the year when the climatic conditions preclude the possibility of infection.

On the other hand, I have the assurance of Dr. Salmon that no cattle will be shipped to Canada that would not be allowed to enter the northern states for grazing purposes.

Under existing conditions, therefore, we are in an even better position than those states, as we enjoy the additional safeguard of the extra inspection made by our own officers at the international boundary.

I propose to make a further investigation of the whole subject during the coming winter, and hope to be in a position to recommend a definite policy before the trade recommences next spring.

## AMERICAN VETERINARY MEDICAL ASSOCIATION.

This association has now been in existence for forty years, and throughout the whole of that long period it has been of great benefit to the veterinary profession on this continent, although, until very recently, its operations were largely confined to the United States. Originally styled the United States Veterinary Medical Association, its members decided in 1898 to extend its field of usefulness, and by assuming the title 'American' remove at once the scruples of those Canadian and Mexican veterinarians who, while sympathizing fully with its aims and objects, did not clearly see their way to joining a body which could not officially recognize their existence.

On the membership roll are now to be found the names of many leading Canadian practitioners, who yearly attend the meetings, and who are appreciative and enthusiastic friends and supporters of what is to-day the most progressive and influential veterinary organization in the world.

Feeling that the meeting of such an association in Canada would tend to stimulate the interest of Canadian veterinarians in their professional work, and lead them to consider means for the proper advancement of comparative medicine in the Dominion, I, last year, when at Minneapolis, invited the members to hold their next annual convention in Ottawa. Although a meeting had never before been held outside of the United States, the invitation was cordially accepted, and during the first week of last September a large number of the leading veterinarians of America gathered in Ottawa.

Many valuable papers on subjects of interest, not only to the profession but to stock owners and the public generally, were read and discussed, and much useful information was elucidated and put in concrete form for future reference.

The contribution to the literature of tuberculosis made by Dr. Salmon, Chief of the United States Bureau of Animal Industry, which is published herewith, is not only interesting and instructive in itself, but is specially notable inasmuch as it disposes effectually of the contentions of Professor Koch, who two years ago, astounded the scientific world by advancing the theory that human and bovine tuberculosis were entirely different, and that it was practically impossible to communicate the disease from the human to the bovine species or vice versa. Although this theory was entirely at variance with the views held by almost all other students of the subject, many of whom have a much wider and more practical experience of this particular phase of the subject than has the great German, it was universally felt that his opinions were entitled to respect, and that the ground must be again carefully traversed before they could be contradicted with that measure of authority which, under the circumstances, the public would demand.

Many leading European scientists have since brought forward strong proof that Koch's position was untenable, but it remained for Dr. Salmon to demonstrate to the people of America that human and bovine tuberculosis are clearly intercommunicable, and that comparative pathologists had made no mistake in sounding, as they did, an early note of warning against the use of meat and milk from diseased animals. While in one sense the corroboration of Professor Koch's contention would have been more acceptable and reassuring than its successful denial, it is a great satisfaction to those who have all along held opposite views, to know with certainty that their conclusions, arrived at through long experience, are well founded and incontrovertible.

The paper of Senator Edwards on the Bang system of dealing with bovine tuberculosis ought to be of great interest to all breeders and owners of cattle, more particularly to owners of valuable stock, the slaughter of which would involve a considerable and, as pointed out by Mr. Edwards, unnecessary sacrifice.

Another valuable and interesting paper which I have also considered it advisable to publish was that read by Dr. Higgins, pathologist to this branch, on 'Anthrax and Blackleg.' Much haziness prevails in the public mind as to the points of difference between these two distinct maladies, and not a few veterinarians of the older school will be none the worse of reading this short and instructive monograph.

The other papers presented at the meeting were numerous and interesting, but the three above mentioned have been selected for publication as being of special value in the work of this branch of your department.

In addition to the technical and professional features, the programme was lightened by interesting addresses from prominent public men.

A large number of Canadian practitioners were in attendance, and advantage was taken of the opportunity thus afforded to hold a special meeting for the purpose of discussing the status of the veterinary profession in the Dominion, with special reference to raising the standard of education. This step is considered necessary, in view of the rapid advance of scientific knowledge and the wider field now covered by comparative pathologists.

The discussion, which was animated and intelligent, culminated in the appointment of a committee to confer with the college authorities, with a view to the adoption of an extended curriculum, and a higher standard of matriculation.

One day was spent at Rockland, whither, through the kindness of Senator Edwards, the whole party, numbering nearly four hundred, were conveyed free of charge, and where they experienced the open handed hospitality for which the proprietor of Pine Grove farm is famous.

It was here that the papers on tuberculosis were read and discussed, and the occasion was one not to be lightly forgotten by those fortunate enough to be present.

All the other meetings were held in the City Hall, Ottawa, which was kindly placed at the disposal of the association by the municipal authorities, who also assisted in a most generous and spirited manner in entertaining the visiting veterinarians and the ladies accompanying them.

Various social features were arranged with a view to rendering the occasion pleasant as well as profitable to the visitors, who, it may be said, expressed themselves as highly pleased with their experiences at the Canadian capital. The thanks of the committee on local arrangements are due to the Government of Canada, the Ottawa City Council, the Ontario Veterinary Medical Association, the Veterinary Association of Manitoba, the Central Canada Veterinary Association, Professor Andrew Smith, of the Ontario Veterinary College, and, last but not least, to Senator Edwards for valuable and tangible assistance in carrying out the programme.

The officials of the Department of Agriculture, especially the officers of the Experimental Farm, also did much to add to the success of the meeting.

### QUARANTINE STATIONS.

I have to report that, owing to unavoidable circumstances, no great progress has been made during the year in the direction of perfecting the arrangements now existing for the quarantining of stock imported by sea.

The station at Point Levis, on which many repairs and improvements have this year been made, is, in most respects, a model establishment, being exceedingly well conducted by Dr. Couture, whose long experience and deep interest in his work render him a most valuable officer.

In one essential point, however, it is capable of great betterment. Under existing conditions, imported animals are compelled, after landing, to traverse the public highway for a considerable distance in order to reach the quarantine inclosure.

Up to a very recent date no practical means of overcoming this difficulty, at a reasonable cost, has presented itself.

An electric railway has now, however, been constructed to within a very short distance of the station, and I would strongly recommend that an arrangement be made for its extension into the grounds. If, in addition, the receiving shed were moved from its present position to the I. C. R. wharf, which is conveniently situated, animals could be taken by car direct from the ship to the quarantine station and much present risk and labour eliminated. The advantage to animals leaving quarantine would also be very great, as they could be loaded on the grounds instead of being, as now, driven for a considerable distance just before shipment.

At St. John, N.B., matters are by no means satisfactory. No regular quarantine station exists here, and the premises rented for the purpose are not at all suitable for the proper and healthful isolation of imported animals.

The subject has been receiving the earnest attention of Dr. Frink, the officer in charge, who has, during the year, furnished several exhaustive reports, and who is deeply interested in the proposition to place matters on a better and sounder basis. So far, however, little progress has been made. In company with Dr. Frink, I examined, in August last, a plot of land belonging to the Department of Railways, which I am satisfied would be in every way suitable for our purpose, and negotiations are now being carried on with a view to its transfer to this department.

Conditions at Halifax are somewhat similar. The old quarantine station at Dartmouth has now been abandoned; the buildings, which were mere shells erected many years ago, having fallen into such disrepair as to be totally unfit for the housing of animals, while the location was inconvenient to a degree.

With the co-operation and assistance of Dr. Jakeman, our officer at Halifax, I have been for some time endeavouring to secure a site for a new station, but hitherto without success. I visited Halifax twice during the year, and examined a number of properties, but have not yet been able to obtain a suitable site at a reasonable figure.

While few animals are imported via Halifax, it is important that accommodation should be available there when it is required.

No important changes have taken place in the arrangements for inspecting animals imported from the United States. At Niagara Falls the resignation of Dr. Boulter, our officer there, necessitated a new appointment, and Dr. T. E. Watson has been placed in charge of the quarantine station, with authority to make necessary inspections.

At Melita, Man., the death of Dr. Livingstone has left us without a regular officer at that point, although inspections are being made when required by a veterinarian employed by the customs officer.

The extension of the Great Northern Railway across the international boundary to Elko, B.C., rendered necessary the removal of the customs office from Phillipps to Gateway, which is situated on the railway seven miles west.

In order to facilitate inspection, a corral has been erected by the department at this point.

Difficulties are constantly arising, owing to animals being presented for entry at customs ports where we have no resident officer, and where it is therefore impossible to make satisfactory inspections without annoying and vexatious delays.

I would again impress upon you the urgent necessity of selecting points where animals imported from the United States may be properly inspected, and, when necessary, quarantined. This is the method followed by the United States authorities, and I am satisfied that if importers were once fully informed as to the points at which animals could enter it would be found much more convenient and satisfactory for all concerned than the arrangement at present existing.

## CAR INSPECTION.

As stated in my special reports on hog cholera and other diseases, a good deal of attention has been paid during the past year to the cleansing and disinfection of stock cars. This work, unless supervised, is apt to be either neglected altogether or performed in such a perfunctory manner as to be of little avail.

The strict methods adopted in dealing with cars coming from the New England States during the prevalence of foot and mouth disease there, the insistence on cleanliness in cars entering Canada at Windsor and Sarnia, as well as at Gateway, B.C., and other points, and the methods adopted to insure disinfection of cars used for the conveyance of live hogs from the quarantined area in Kent county, Ont., have all had a salutary effect upon the officials of the various railways concerned. A proper appreciation of the maxim that 'whatever is worth doing is worth doing well' is indispensable for the satisfactory performance of this work.

The higher officials of the various roads, as a rule, realize the importance to their companies, as well as to the public, of doing what in them lies to assist the department in its efforts to prevent the spread of contagious disease among animals, the carriage of which constitutes one of their most lucrative sources of revenue.

It is often, on the other hand, a difficult task to impress upon the unthinking and not unfrequently overworked agent or yardmaster the necessity for properly cleansing and disinfecting a car which looks to him exactly like scores of others allowed to go on their way without interference.

The public interest, however, demands that the lesson be thoroughly learned, and it is my intention to see that all orders on this subject issued by the department are, as far as possible, carried out in a thorough and systematic manner.

### STOCK YARDS.

Considerable improvement has been effected since the date of my last report in the condition of stock yards throughout the country. In view of the importance of the yards at Schreiber, which are extensively used for the accommodation of stockers going west as well as for export cattle bound to the sea-board, I, last winter, instructed Dr. Hopkins to make a thorough inspection, and report fully as to the conditions prevailing there, many complaints having been received from shippers of live stock. His report, which was very full, was laid before the Canadian Pacific Railway authorities in Montreal, with the result that a marked improvement in the condition of the yards has been brought about, as reported by Dr. Moore, who made an inspection later in the season.

The yards at North Bay have been rebuilt and greatly improved. At other points also, good work has been done.

The Canadian Pacific Railway yards at Montreal are still in an exceedingly unsatisfactory condition, being quite unfit for use in wet weather. The company is considering the erection of new yards in a more suitable location, and the matter has therefore not been pressed. Failing an early decision on this point, it will be necessary to take steps to have the present yards put into decent repair.

West of the lakes considerable improvement has been effected. At Winnipeg entirely new yards have been constructed, and are being conducted in a satisfactory and businesslike manner.

At Moosejaw the yards have been repaired and put into reasonably decent condition, but there is still room for great improvement at this point.

The accommodation at Calgary has been increased, sheds have been erected and other improvements carried out. At many other points in the Territories new yards have been constructed, while at others repairs and enlargements have been effected.

At Vancouver, where a considerable shipping trade demands accommodation, the facilities are altogether inadequate. Here, as at Montreal, the Canadian Pacific Railway Company has in contemplation the removal of the yards to another site, and therefore desires to avoid the undertaking of extensive repairs to those now in use. Temporary improvements are, however, being carried out.

Mr. Peterson, Inspector of stock yards and cars for the lines west of Winnipeg, has kept in close touch with his work, and has personally seen to most of the matters coming within his jurisdiction.

Full details regarding the work of this branch throughout the Dominion will be found in the individual reports of the various inspectors published herewith.

I have the honour to be, sir,
Your obedient servant,
J. G. RUTHERFORD,
*Chief Veterinary Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 16.

# REPORT OF THE PATHOLOGIST.

(Chas. H. Higgins, B.S., D.V.S.)

Ottawa, October 31, 1903.

Sir,—I have the honour to transmit this, my fifth annual report as an officer of the Department of Agriculture, being my second as pathologist, covering my work from November 1, 1902, to October 31, 1903.

During the first six weeks of this period the work was conducted in the temporary quarters furnished at the Imperial building on Queen street, in the heart of the city. On December 15 the apparatus was moved to the new building on the Experimental Farm, specially designed for this work. Some unavoidable delay was experienced in the placing of the apparatus, which was but a natural sequence to moving. At the present time the laboratory is in full working order, and the equipment is sufficient to conduct with facility the routine investigations and diagnoses which are required.

In equipping this laboratory the aim has been to select standard apparatus, which was thoroughly up to date in every respect, and also some of the more important labour saving devices for use in this line of work. We are, I think, amply repaid for the manner in which this institution has been equipped, for nothing but praise has been received from some of the foremost laboratory men on this continent who have visited it.

The gas installation is giving perfect satisfaction, regardless of the many discouragements which were offered at the outset. This gas plant will be fully described later in this report.

The most serious drawback to the work at the present time is the lack of assistance in carrying out the various lines of investigation. To conduct the routine work of a laboratory which is attaining the size of this one, and at the same time carry on original investigations, not only on one subject, but on several, single handed, is a herculean task, and for this reason many of the interesting and valuable investigations under way have had to be practically discontinued. (The force of this statement is more apparent from the fact that during the past year there have been received one hundred and six series of specimens as compared with thirty-two of the year preceding.) Particularly is this the case when it is borne in mind that the field for investigation and original research on comparative lines in Canada is practically unlimited, and also, that many of the specimens received require considerable original work before correct diagnoses can be given. Then too, there is a desire to pursue these investigations further than the mere diagnosis, when we have an affection which is entirely or practically new to a certain section of the country, and also is this the case when we encounter conditions upon which absolutely nothing has been written.

Much material of this nature has been received; with the result that it is possible to present in a new aspect some of the diseases occurring in Canada, but much of which it is necessary to pass over, due to the presence of routine work which requires immediate attention.

A detailed statement of the various specimens received, with their diagnoses, will not accompany this report, save in instances where such are considered under the various headings dealing with special investigations.

I cannot lay too much stress upon the point, that the fuller investigation of the various diseases as seen in Canada would not only prove interesting to those conducting such investigations, but would also prove of inestimable value to the country, in placing at the disposal of the mass the means of more easily combating, if not wholly preventing, serious outbreaks of contagious disease.

The needs of the laboratory, for the routine as conducted at present, are very small, but if the work is to render the best service to the livestock interests of this country there are many things which can be greatly improved upon. The needs of an institution of this sort are in proportion to the amount of work which is being carried on, and if we are to undertake original work along lines which are briefly outlined under some of the subjects taken up in this report, the equipment will of necessity have to be increased to meet the additional demands.

Without further preliminary remarks, details will be given under the various headings which follow.

## ANTHRAX.

No original work has been attempted with this affection nor has the production of vaccine received consideration.

This disease is one which frequently receives attention at the laboratory, through the requests for diagnosis, as to whether or not the causative agent is present in material from dead animals, more particularly those in which death has been sudden.

During the past year material has been furnished from fifteen suspected cases, in five of which the causative agent of the disease was found. Three of these cases were in Cornwall, Ont., one at Cap St. Ignace, Que., while the other was at North Lunenburg, Ont.

Much of the material came from the eastern townships, in the vicinity of Sherbrooke, but in none of these instances was the bacillus anthracis found. (In all probability death was due to the bacillus which we are at present studying to determine its pathogenic powers. This bacillus appears almost identical to the bacillus bovisepticus, the causative agent of haemorrhagic septicaemia in cattle, and will receive further consideration under that heading.)

## TUBERCULOSIS.

There have been a number of specimens suspected to contain lesions of tuberculosis submitted for examination, the results in nine of which have been positive.

A large number of small animals have been inoculated for the recovery on artificial media of cultures of the causative bacillus. These cultures have been used in the experimental preparation of tuberculin, and have been tried on various liquid and solid media with varying results. This work of accustoming a culture of tubercle bacilli to a given medium is a very tedious one, but is nevertheless very interesting, and I have been able to obtain cultures which produce good tuberculin through this method. The media used for the artificial culture of the bacilli have been very extensive, but principally confined to well known formulae. One of the newer (for isolation), an egg medium,* consists of the yolk and white of egg mixed together and solidified in a serum oven. This has been found very serviceable, the more so on account of its easy preparation. I have, however, modified the sterilization somewhat, by placing a small quantity of water in the serum oven, which, during the process of solidifying, provides sufficient moisture in the tube, thus doing away with the necessity of adding water to furnish moisture at the time of inoculation.

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* M. Dorsett.—The use of eggs as a medium for the cultivation of the Bacillus Tuberculosis.—Annual Report of the Bureau of Animal Industry. 1901, p. 574.

The writer, in 1901, experimented with the acid brain media of Ficker,* and also with original formulae, using the brains of the horse, cow, dog, hog and sheep. The results were varying, some, however, giving remarkably good growths in a minimum period. (These results have not been published, for the reason that it is desirable to repeat a great deal of the work, in order that the findings may be fully verified, an opportunity for which, has not up to the present time, offered itself.) Some of the brain agars prepared at this time were very serviceable in routine investigations, though at the present time they are not used, owing to the difficulty in their preparation.

The conducting of experimental work on distinctly original lines has not been undertaken, on account of the impossibility of finding time with the other laboratory routines to give to it the attention that would be required to obtain data of value.

The work of the Bureau of Animal Industry of the United States, as presented in a paper read by Dr. D. E. Salmon† at the farm of Senator Edwards, Rockland, Ontario, during the recent meeting of the American Veterinary Medical Association, the results of which indicate that bovine and human tuberculosis are due to an identical bacillus, refutes the statement of Koch as given at the congress on tuberculosis, held at London in 1901.

Neufeld‡ gives the result of Koch's experiments in the immunization of cattle to tuberculosis. They substantiate his assertions concerning the identity of the bacilli of bovine and human origin as given at the London Congress in 1901.

The experiments, conducted under the supervision of each of these two men, are the result of very nearly two years' research, and have been very carefully carried out. The conclusions are carefully drawn, yet there is still as wide a divergence of opinion as formerly on this important subject, one upon which the majority of bacteriologists and pathologists have done more or less original work.

In view of the controversy which still exists, and the wide importance of the subject, I would urge that work of a similar character be taken up here, that this branch of the department may add scientific facts of world wide interest to our present knowledge of this disease. If it is desired that such experiments be undertaken, I feel safe in saying that a series of experiments could be devised along entirely different lines than those followed by the investigators mentioned, and further, that they would in all probability not only solve the problem of the relationship between the two diseases, but would also lead to their more scientific prevention and treatment.

I would also urge that something along the line of immunization be taken up. This subject is one of the foremost at the present time, and we should, I think, add to the scientific data which is being published on the subject.

It would be a pleasure to take up this work, particularly that with reference to the relationship of bovine and human bacilli, as it is still an open question, and much yet remains to be accomplished.

### TUBERCULIN.

During the past year there has been dispensed at this laboratory 143,460 minims of tuberculin, a sufficient quantity to test 2,391 head of cattle.

The tuberculin dispensed was obtained from Koch's laboratory, prepared under the direction of Dr. Liberty, each bottle bearing his seal.

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* Centralblatt F. Bact., Etc., 1900, Abt. 1, Bd. XXVII., No. 14-15, p. 504 and No. 16-17, p. 591.

† Salmon.—Bovine and Human Tuberculosis, American Veterinary Review, Vol. XXVII. No. 7. Page 572.

‡ Neufeld.—Deutchse Med. Wochenschuft, Berlin and Leipsic, Bd. XXIX. No. 37. Abstract, Jour. Am. Med. Ass. Oct. 3, 1903.

A quantity of tuberculin has been manufactured at the laboratory, some of which was used on experimental animals (cattle) known to be tuberculous, and in every instance a pronounced reaction was obtained. The small laboratory experimental animals have been repeatedly tested with this tuberculin, and in every instance reactions have occurred in tuberculous animals, while healthy animals have manifested no rise in temperature or other clinical symptoms as a result of such inoculations.

### GLANDERS.

Material from a large number of cases of glanders has been dealt with. The writer has also conducted autopsies on a number of the more interesting subjects which were found during the outbreak in this city of last fall.

One case in particular was very interesting, on which, at the suggestion of Dr. Rutherford, an autopsy was held to ascertain whether or not the lesions resulting from the injection of mallein into glandered horses, as described by Hunting, were present. This animal received a large dose of mallein (three times the regular amount used in routine testing), the autopsy being held on the second day after the injection. Previously the subject had been tested on two occasions, and at the time of this third test was commencing to show clinical symptoms, namely, the presence of enlarged sub-maxillary glands and a slight nasal discharge.

The autopsy revealed the peculiar markings on the lungs which were quite pronounced. The markings on the heart were not such as would impress themselves unless one were making a very careful examination. The spleen showed the petechial spots, the largest being about two millimeters in diameter. There were also petechial spots on the liver which were about one millimeter in diameter. The presence of these spots on the liver was not mentioned in the paper of Hunting, nor have I seen mention of a similar condition elsewhere. This case, however, is the only one in which this peculiar marking has been observed, and it is possible that the large amount of mallein injected may have been responsible for its appearance.

The lesions other than those mentioned consisted of glanderous foci in the submaxillary glands, a few ulcers on the scheneiderian membrane, together with a few glanderous nodules in the lungs. The liver was not involved in the infection, nor were lesions observed in other organs of the abdominal cavity.

A great many laboratory animals have been used in connection with the recovery of the causative agent, the bacillus mallein, and also in connection with the testing of various lots of mallein prepared. Much experimentation of a technical character has been conducted on this subject, which would be of little interest to this report, though it has nevertheless consumed considerable time in the laboratory routine.

I am able to present herewith a few photographs, showing lesions which are not usually met with in the ordinary field work on glanders.

One of these (plate I) shows the two testicles of a horse in which the disease had gained considerable headway through the incorrect diagnosis of the veterinarian in charge. In the case of this animal, the history indicates that the first symptom noticed was connected with the serving of mares, which would imply the involvement of the testicles early in the disease. At the time he was destroyed the disease was generalized, there being ulcers on various parts of the body of an indolent character, with farcy buds on all four legs. Arsenic was given in large quantities, and for a time beneficial results were said to have been produced, but these lasted for a limited period only. There had been a nasal discharge from time to time; this, however, was very slight at the time of killing the animal.

The autopsy revealed lesions of chronic glanders, and laboratory animals inoculated with portions of the lungs and with the pulp of the testicle developed the acute disease in a generalized form.

The second photograph (plate II) shows lesions of a chronic character on the schneiderian membranes of two animals. That showing the greatest* ulceration and almost complete destruction of the septum nasi was taken from a horse which, as near as can be ascertained, was one of the original sources of infection in the Ottawa outbreak. This animal was not found until just after it had been killed, and by tracing back it was found that he had been in contact with many other animals which were later destroyed, the majority of which showed clinical symptoms.

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*N.B.—The photographs referred to above will be found in the monograph form of the report.

The scars of a partially arrested case are particularly well shown on the other septum nasi in the same photograph, and are of interest as indicating the condition present in what many consider a cured case of glanders. In this instance active infective material was found in the lungs, which destroyed guinea pigs with characteristic symptoms and lesions.

The photograph of the larynx (plate III) opened from behind shows scars in the trachea, and is from the same case as the septum nasi showing scars on the schneiderian membrane.

## MALLEIN.

During the past year there has been dispensed at this laboratory 3,382·5 cubic centimeters of mallein, a sufficient quantity to test 1,353 horses. This mallein (with the exception of 345 cubic centimetres, a sufficient quantity to test 138 head of horses, prepared by myself at this laboratory) was obtained from the Chicago office of the Pasteur Institute, through the office of the Chief Veterinary Inspector.

Much experimental work has been conducted in connection with the preparation of this product, with the result that little difficulty is experienced at the present time in its manufacture.

## PICTOU CATTLE DISEASE.

The investigation of this affection has revealed little or nothing of interest in addition to the work of previous investigators. A great many cultures were made from material furnished (pipettes from diseased animals) by W. H. Pethick, V.S., who conducted the field work. These cultures have invariably contained a various bacteriological flora; a form of the bacillus coli, appearing constantly, more particularly in the preparations taken from the liver and mesenteric lymph glands.

The lesions have in every instance been those described by Drs. Osler, Wyatt Johnston, and Adami. After perusing the official reports of these gentlemen, I am unable to make further additions to the microscopic appearance in the lesions of this affection. I agree with the later statement of Dr. Adami,* that the bacillus so frequently found in the mesenteric lymph glands is a form of the bacillus coli, and if it is connected with the affection in any way such connection is only incidental or secondary to some predisposing cause concerning which we are not fully informed at the present time.

It is my opinion that the disease has no infectious causative agent, but that it is the result in a great measure of local conditions. As to the exact local condition, I do not desire to express myself in detail, as it has never been my privilege to visit the district in which the affection is prevalent. From its history, and from the idea that the plant, Senecio Jacobea, is responsible, coupled with the existence of a similar affection in New Zealand, where the local idea is that the same plant is responsible, and the partial success of experiments conducted by Mr. Gilruth, M.R.C.V.S., Chief Veterinary Officer of that colony, in producing the disease by feeding this plant, would lead one to suppose that the direct or exciting cause of the affection was in some way connected with it.

The Chief Veterinary Inspector, Dr. Rutherford, has experiments under way at the present time, the aim being to determine if possible the cause of this affection.

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*Adami.—Report of the Minister of Agriculture for the year of 1901. Page 132.

## HOG CHOLERA.

The subject of hog cholera was, during the first few months of the year, given considerable attention. Later, with the pressure of other work, investigations have been almost entirely discontinued, for the reason that if reliable results are to be obtained from such investigations, it is necessary for one to devote almost his entire time and attention to this one subject. This close application to the study of this disease '*requires a long series of experiments without interruption, and conducted by the same person,*' as pointed out by Dr. D. E. Salmon, Chief of the Bureau of Animal Industry of the United States, in his report for 1901.*

There are at the present time quite a number of cultures from various outbreaks of hog cholera, which have been obtained from the material sent in for diagnosis and from that which has been forwarded by request of the writer (through the office of the Chief Veterinary Inspector), that the material might be at hand to conduct original work.

The importance of this work is the more forcibly demonstrated through the recent appearance of a circular† of the Bureau of Animal Industry, in which preliminary investigations are cited, giving data concerning ('a form of hog cholera not caused by the hog cholera bacillus'), and which is very closely related to it, both in its clinical symptoms and pathological lesions.

This new form of hog cholera is seen in the acute type, and is very fatal. It is communicable to hogs only, other animals being immune. Outbreaks of hog cholera caused by what is generally termed the hog cholera bacillus may be complicated by this newly described affection.

The sanitary regulations required to control outbreaks of this new form of hog cholera are identical with those necessitated in outbreaks caused by the Bacillus Cholera Suis of the Haemorrhagic Septicaemia group.

In undertaking the investigations on hog cholera, the main idea was to determine whether the '*serum diagnosis*' could be applied with certainty, and if so, its practicability for use in the field. This work in many respects has been rather discouraging, for in some instances the characteristic agglutination reaction could be demonstrated with little difficulty, and again when tried with serum from animals that at the autopsy revealed lesions, which were undoubtedly those of hog cholera, the results have been negative.

In my hands this means of diagnosis has never given the impression of being sufficiently reliable to enable it to be used in a practical manner, though with experimental laboraty animals, there has been little or no difficulty experienced in obtaining characteristic results with a dilution of 1:50.

In connection with this work I do not consider it advisable to undertake further investigations till such time when it will be possible to work, not only upon the usual laboratory experimental animals, but also upon diseased hogs. It is only by work upon the animals which are liable to contract the affection that we are able to eliminate errors in drawing conclusions as to the prevention and treatment.

I append to this brief statement on this subject photographs (plates IV, V and VI) of specimens showing lesions of the intestine common to hog cholera, in their various forms. These no doubt will prove of benefit to those who have never been unfortunate enough to suffer from its ravages. It will also render the diagnosis easier, should a reader at any time see the lesions.

A detailed description will be found in connection with the explanation of the plates.

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* Salmon.—Eighteenth annual report of the Bureau of Animal Industry of the United States, 1901, p. 9.

† deSchweinitz and Dorset.—Bureau of Animal Industry. Circular 41. October 1st, 1903.

### CATTLE TICKS.

The laboratory services have been called upon in the identification of a cattle tick. This tick was taken from a lot of cattle which were shipped from Mexico, through the United States, to Canada. From the history of these cattle it appeared that they were possibly infected with the 'Boophilus Bovis' (Riley), the tick which transmits infection in Texas fever.

The tick in question was identified as 'Ornithodoros Megnini,' the 'Spinos ear tick,' which is a harmless species.

### DISINFECTANTS.

A sample of disinfecting material resembling creolin was forwarded for examination to determine its efficacy. It proved to be quite efficient. To publish at this time a statement concerning the same would be unjust to other manufacturers, who probably have articles which are equally efficient; therefore no details will be given in the present report concerning this matter, which has occupied considerable time.

### HAEMORRHAGIC SEPTICAEMIA.

This disease while not having been actually identified as occurring in Canada, sufficient data has been obtained to indicate that its existence is, unfortunately, more than a probability. Much of the material sent in from the vicinity of Sherbrooke, Que., as suspected 'anthrax' has failed to reveal indications of this disease. The autopsy lesions as described by those making autopsies reveal the haemorrhagic nature of the affection. This haemorrhagic nature of the disease has been confirmed through material which has been received at the laboratory, and in similar preparations from which a small bacillus could be made out, but with which it was impossible to reproduce pure cultures or infect animals.

Later, with cultures furnished from a case upon which an autopsy was performed by Dr. A. W. Tracy, of Sherbrooke, Que., a bacillus has been isolated, which resembles, in the majority of its morphological characteristics, the Bacillus Bovisepticus. With this germ it has been impossible to infect either rabbits or guinea pigs.

I have received and am studying the peculiarities of a culture of Bacillus Bovisepticus, forwarded on request by Dr. F. F. Wesbrook, Director of the Minnesota State Board of Health Bacteriological laboratory, which was isolated from an outbreak of haemorrhagic septicaemia in that state. This germ kills rabbits in eight hours with characteristic lesions.

A full comparison of the two germs is not complete at the present time.

Steps have been taken to obtain material from diseased cattle in the vicinity of Sherbrooke, and it is hoped that the disease may be definitely identified, that advice can be given as to preventive measures, that they may be based on scientific facts.

This disease is not similar to that studied by the author in L'Avenir and Cowansville, Que., in the summer of 1899, as no haemorrhagic lesions were found in these cases. Also cultures from the various organs were negative.

### ACTINOBACILLOSIS.

Actinobacillosis is a disease which has for many years been confounded with actinomycosis. The difference between the two affections was first pointed out by Lignieres and Spitz.* as the result of extensive investigations conducted in the Argentine Republic. The difference between their causative agents is indicated by their names. Actinobacillosis is caused by a bacillus; actinomycosis is caused by a streptothrix.

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* Lignieres and Spitz.—Actinobacillose. Recuil de Medecin Veterinaire. September 30, 1902.

The possibility of our having the two diseases in Canada was first mentioned by Dr. J. G. Rutherford, Chief Veterinary Inspector, in his report of last year.

During the year just ended two cases have come under our notice, from one of which it has been possible to isolate a bacillus, which I am at present studying, with a view to determine its relationship with that isolated by Lignieres and Spitz. Guinea pigs and rabbits have died with characteristic symptoms and lesions.

A detailed statement cannot be made at the present time, owing to the incompleteness of the investigations under way; but it is hoped that these details may be published within a short period.

A photograph of the tumour from one of the cases is appended herewith (plate VII). A photomicrograph is also appended, showing the lesion, in which the tufts are clearly indicated (plate VIII).

## LABORATORY PHOTOGRAPHY.

This subject may not seem in place connected with an institution of this character, but to those familiar with the routine work it is conceded that photographs of diseased animals, pathological specimens and microscopic preparations are of the utmost importance.

The only photographic work conducted at the laboratory is that of microscopic specimens. These photomicrographs give a means of accurately measuring microscopic objects and are easily preserved for future reference. The production of good photomicrographs is considered the most difficult branch of the photographic art, and as such it deserves special mention here. As a novice in the work, I am able to reproduce herewith a very good photograph of a microscopic object. In this connection I may state that the greatest difficulty was experienced in connection with these specimens of actinobacillosis, as the tufts were stained with eosin, a dye which is very difficult to impress on the most sensitive photographic plates.

The apparatus used is that of Zeiss, the light being furnished by a battery of four, fifty candle power acetylene jets, combined with a concave mirror and a single condensing lens. Using a greenish yellow screen, the average exposure is from twelve to sixteen minutes with the oil immersion lenses, and an amplification of one thousand diameters.

This portion of the work has proven very interesting, though the time has been very limited. It has, however, been impossible to pursue this work to the extent necessary for permanent records.

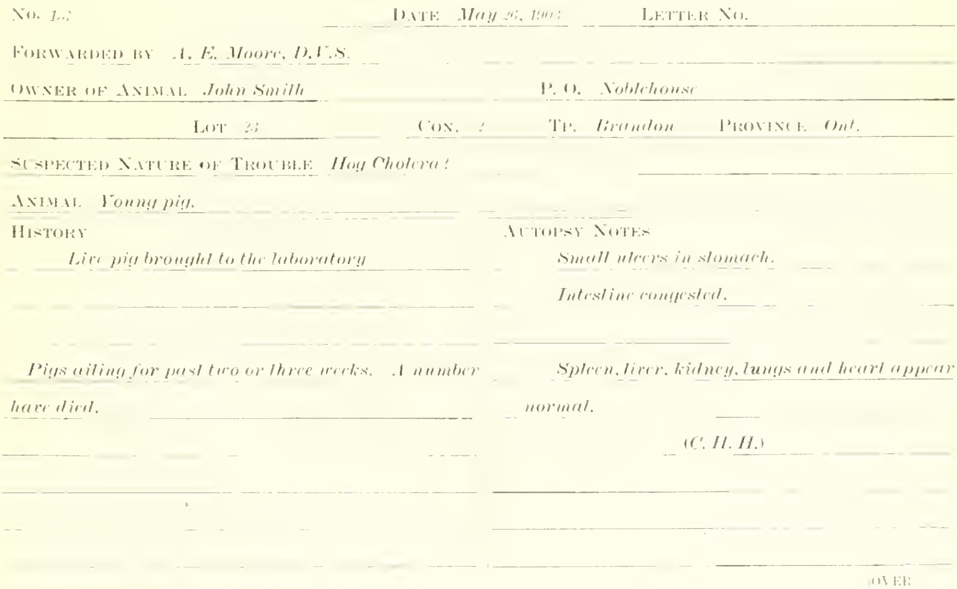
## LABORATORY RECORDS.

The keeping of the records in connection with the various investigations under way, and also of the various routines of the laboratory, is of the utmost importance. Unless the information at hand is available it is worth little or nothing, as it cannot be found when wanted. Knowing the needs in this direction, I have ever had in mind, in establishing this institution, the necessity of having a complete record of everything that has been done from time to time. In the keeping of records I do not consider that they are of value unless complete at all times, which completeness removes the possibility of one losing any particular bit of information, or of leaving undone work which is of vital importance

I deem this matter of keeping records of more than passing importance, knowing as I do from actual experience how hard it is to devise a system which will meet every particular, and which also leaves no loopholes for possible mistakes. This system, the details of which I am about to describe, has been evolved after hard study and experimentation. It is a result of experience, not only in this laboratory, but also that which has been obtained from observation and trial of the methods of other laboratories with which the writer has been connected or had the privilege of visiting. My system is not by any means without some disadvantages, as in any system difficulties arise which are very hard to overcome, but after nearly a year's trial I take pleasure in stating that it is very satisfactory. It is far superior to any which has previously been used by the writer.

This system is based on the well known 'card index' idea, but for the various records I have designed special cards for the original and for the cross records.

Without further details I will explain the figures which are fac-similes of the cards in daily use.



No. *1[illegible]* Date *May 26, 190[illegible]* Letter No.

Forwarded by *A. E. Moore, D.V.S.*

Owner of Animal *John Smith* P. O. *Noblehouse*

Lot *23* Con. *2* Tp. *Brandon* Province *Ont.*

Suspected Nature of Trouble *Hog Cholera?*

Animal *Young pig.*

History

*Live pig brought to the laboratory*

*Pigs ailing for past two or three weeks. A number have died.*

Autopsy Notes

*Small ulcers in stomach.*

*Intestine congested.*

*Spleen, liver, kidney, lungs and heart appear normal.*

*(C. H. H.)*

OVER

Specimen Record. Figure 1.

The first of the specimen record cards is shown in figure 1.

The number which appears in the upper left hand corner is the most important feature of this card, as this number identifies everything in the laboratory connected with a given specimen. All jars and slides, as well as cultures from the particular case in question, bear the one number, and there is no time lost in hunting over the laboratory for the information desired, nor is it necessary to write labels giving the complete title of the material of an individual case. This numbering instead of writing out labels has been found to be an immense labour saver, and also saves time in finding given specimens in the event of further inquiry or investigations. The writer has tried having serial numbers for the different kinds of specimens, but the keeping of the records has been complicated, and the desired information could not be obtained with facility when desired.

My method does away with the conflicting of numbers, and gives uniformity to the work, which is an essential feature.

Information as to the date of the arrival at the laboratory, the letter number, by whom it was forwarded, the owner of the animal with his post office address, and also the exact geographical location from which the material was obtained is seen at a glance. Space is given for the suspected nature of the trouble, and also the species of animal from which the material in question was taken. There are also spaces for the history and autopsy notes. These two latter spaces may seem to be very small, but in actual experience it has been found that there are but few cases in which there is not ample room for a brief resumé of the case. Should there be more than can be placed on the portion of the card allotted to the purpose, one can easily use an ordinary record card, placing the number of the material in question in the upper left hand corner for the purpose of identification, filing it in the cabinet immediately behind the regular form, and it is always available. If this course is not desired the number of the letter is always in sight on the face of the card, and can be referred to in an instant.

| | |
|---|---|
| NATURE OF EXAMINATIONS MADE | REPORT *1-6-03* |
| | LETTER NO. *146* |
| *Cultures from spleen, liver, kidney and blood.* | |
| *Cultures sterile after six days incubation.* | |
| | |
| *Diagnosis :* | |
| *Not Hog Cholera.* | |

(Reverse) Specimen Record. Figure 2.

The reverse of figure 1 is shown in figure 2, and provides for a full statement of the examinations made, whether they be macroscopic or microscopic, with their results. The date of making the report is designated, also the 'letter number,' which refers to the page of the laboratory letter-book.

In the routine, a card is filled out on the receipt of material, and is not filed in the cabinet till the case is dealt with and a report rendered. In making the report any one who has had experience will see what a convenience it is to have the whole of the data in such a small space, and not distributed on a number of pages in a temporary laboratory note-book. This card, which is a permanent record, is the original, and there is no possibility of making mistakes during copying as no copying is required.

In filing the record I have another card which enables me to refer to the name of the individual from whom the material was obtained, as can be seen in figure 3. Under the heading 'report' it is the practice to place a + or — sign, this being the simplest method of recording the result. I also enter on a similar card the name of the inspector or person forwarding the specimen. These cards are filed in the cabinet alphabetically, and can be referred to in an instant if an inquiry is made.

NAME *John Smith.*

ADDRESS *Noblehouse, Ont.*

| Specimen Number. | Date received. | Animal. | Suspected Trouble. | Report. | Letter No. |
|---|---|---|---|---|---|
| *137* | *May 26 03* | *Young pig* | *Hog cholera* | | *146* |
| | | | | | |

Specimen Record. Figure 3.

*Tuberculin Record.*—The record giving the amount of tuberculin sent out from the laboratory is kept on cards similar to figure 4. These cards are of salmon colour to distinguish them from other records. This card gives space for the name and address of the party to whom the material is sent, also the date, minims and dosage. In referring to the amount sent to a certain individual, one has only to turn up the card in the cabinet, and at a glance can see the dates and amounts forwarded. This form has been found particularly convenient, as inquiries by telephone from the office of the Chief Veterinary Inspector are frequently received concerning the amounts sent to inspectors. The small space occupied by the information allows the complete record to be carried to the telephone without inconvenience.

NAME TUBERCULIN RECORD. Form No. 5.

ADDRESS

| Date. | Minims. | Doses. | Date. | Minims. | Doses. |
|---|---|---|---|---|---|
| | | | *Bt. for'd.* | | |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Total | | | Total | | |

Tuberculin Record. Figure 4.

In a ledger system, no matter how complete, it would be necessary to copy from the ledger this information before giving the same over the telephone.

*Animal Records.*—These cards, as shown in figure 5, are designed for keeping the records of inoculated experimental animals.

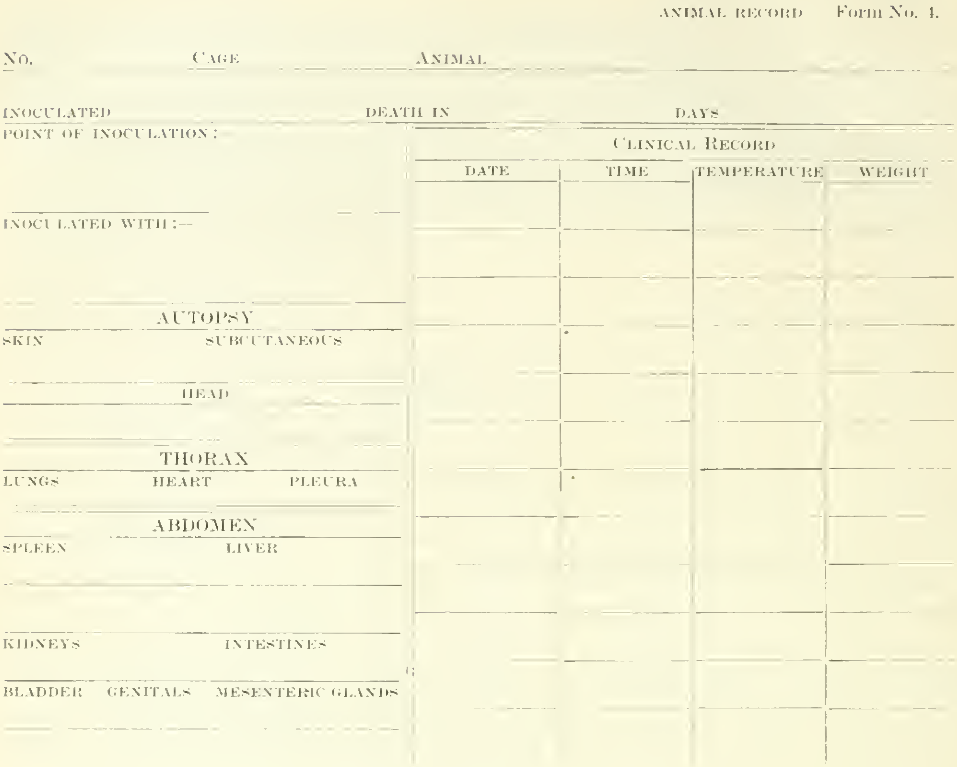
The card is made out at the time of inoculation, and is kept in a small tray in the animal room. The various data are recorded daily, or oftener, as the case in question may require, by the attendant. The card upon the death of the animal is placed with the animal, and at the autopsy the findings are immediately recorded, after which the card takes its place in the cabinet, forming an original, permanent record. There is an advantage in this; in having for the permanent record, the record which is the original, as mistakes may occur more easily where any other form is adopted.

This card is yellow in colour, which is a distinguishing feature.

The card used for mallein, to record the various shipments, is similar to that used for tuberculin, and need not be described in detail.

This completes the list of special cards which are in use at the present time, but no doubt as the work grows it will be found necessary to add new forms to meet the added requirements of the work.

In addition to the cards listed there are also the library record cards which are familiar to everyone who has had occasion to use an up-to-date library, and these need no explanation.



ANIMAL RECORD Form No. 1.

No. Cage Animal

INOCULATED DEATH IN DAYS

POINT OF INOCULATION:

INOCULATED WITH:—

AUTOPSY

SKIN SUBCUTANEOUS

HEAD

THORAX

LUNGS HEART PLEURA

ABDOMEN

SPLEEN LIVER

KIDNEYS INTESTINES

BLADDER GENITALS MESENTERIC GLANDS

Clinical Record

| DATE | TIME | TEMPERATURE | WEIGHT |
|---|---|---|---|
| | | | |

Animal Record. Figure 5.

ACETYLENE GAS AND ITS ADAPTABILITY FOR GENERAL USE IN BACTERIOLOGICAL LABORATORIES.

The author, in his report,* upon the work conducted at the Public Health Quarantine Station, William Head, Victoria, B.C., mentioned the installation of an acetylene plant in connection with the equipping of the Bio-Chemic laboratory of that station. A fuller description was given in an article contributed to the Centralblatt für Bacteriologie† in 1901.

In the equipment of the present Biological laboratory, the question of gas supply necessitated the installation of an apparatus which would serve for all laboratory purposes, and give at all times plenty of gas, with which the various heating and lighting operations could be conducted. From the experience at the above mentioned quarantine station, and from experiments conducted by the writer, there was no hesitation in selecting acetylene as the gas, which would, to the best advantage, fulfil the requirements of this institution. Since first charging the machine on December 15, 1902, there has been little or no difficulty experienced, with one exception; this exception being, the carbonization of the burners which have been used under the various constant temperature appliances. This difficulty is now solved through the invention of special 'turn-down' burners, which have, during the past two months, given perfect satisfaction.

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* C. H. Higgins.—Minister's report. Department of Agriculture. 1900. Page 39.

† C. H. Higgins.—Acetylene gas and its adaptability for use in Isolated Bacteriological laboratories. Centralblatt für Bacteriologie, etc., XXIX Bd. 1901. No. 20. Page 794.

It is of interest to take up this subject rather fully, that others who are about to establish laboratories may have the results of our experience with this gas, and thereby save themselves the annoyance of going through the experimental stages in which it has been necessary for us to participate.

To those who are not fully informed on the subject, it will be well to say a few words concerning the source of the gas and the machines which are used in its generation. For this purpose I can do no better than quote from the article in the Centralblatt für Bacteriologie above mentioned:—

'Acetylene gas is generated by bringing calcium carbide and water together; this causes a decomposition of the carbide, and we have slack lime deposited in the water with the evolution of acetylene gas, ($C_2H_2$). Calcium carbide, or carbide, as it is commonly termed commercially, is manufactured from powdered lime and coke or charcoal, thoroughly mixed, and subjected to a temperature of 3000°C. in an electric furnace. This high temperature causes a perfect chemical combination to take place, and we have as the product calcium carbide. This calcium carbide resembles dark granite in appearance, is very hard and will not burn. It is non-explosive, and can be handled with perfect safety. It is portable, convenient, clean and reliable, and can be obtained almost anywhere in unlimited quantities.

A study of such literature as I could obtain, consisting chiefly of advertising matter setting forth the merits of each particular machine, was very interesting, each advertiser claiming that the machine manufactured under his patents was superior to others. In this study it was ascertained that there were three main types, to one of which all machines belonged, the variation in the different styles being in the mechanical construction by which the same end was brought about, namely, the evolution of the gas from the carbide.

A description of the various styles would hardly be within the limits of this note, involving as it would many minor technical points of little importance. A brief description, however, of the three main types will be given, in order to convey the main idea in the construction of each.

*First type.*—A large quantity of carbide is placed in a receiver so arranged that it can be perfectly sealed; pipes lead to a gasometer for the conveyance of the gas, which gasometer varies in size according to the capacity of the machine. The gasometer on becoming relieved of its gas falls; when it has reached a certain level a valve is opened automatically, allowing a given amount of water to be sprinkled over the carbide in the receiver, whereby gas is generated, forcing the gasometer up to again lower as the gas is used. This operation is repeated as often as is necessitated by the use of gas until the carbide in the receiver is exhausted.

*Second type.*—In another form of machine the water and carbide are so arranged that the gas is generated by changing the level of either. This contact through a change of level produces the gas, which forces the water and carbide apart; till such time as the gas produced has been used and another supply is needed, when the water and carbide are again brought together.

*Third type.*—This form of generator, the one which I consider the most scientific and practical in its principle, is one in which by a mechanical arrangement the carbide is dropped into a large body of water. In this water the gas is evolved, rising to the surface, is collected and passes into a suitable receiver or gasometer. When the gas is used the gasometer falls, causing another charge of carbide to drop into the water, which operation is repeated indefinitely as required. This machine can be recharged while in active operation, as it is not necessary to open any portion, the carbide being supplied from the outside.

My reasons for considering this latter style of machine preferable to the others are as follows: In the first two mentioned, the heat evolved is liable to overheat the gas, or if the machine is doing more work than it should (which is very frequent in practice, the tendency being to procure a machine too small for the work required), it will get so hot that it is dangerous to work with it. Where the carbide is dropped into a large body of water there is never this danger of overheating. Again, in types one and two, the slaked lime will hold small portions of the carbide in its midst, preventing in this way its full decomposition, and thereby cause a loss of gas. In the immersion system, as this third type is called, there are fewer traps to be watched and kept full of water. In the first two types there is a waste, for whenever the machines need recharging it is necessary to open them, through which operation a certain amount of gas is lost.

In the immersion system the carbide is dropped into the water from the outside. but the traps are so arranged that none of the gas generated escapes into the outside air. It is never necessary to open the generating chamber of these machines for any purpose whatever. The generating chamber never being opened, there is therefore less danger of an explosion, it being a well known fact that a mixture of acetylene and air produces an explosive mixture of the highest type. Many accidents have arisen from the use of machines of the first two types from this escape of gas in the process of recharging, against which provision cannot be made.'

Generators for the production of acetylene gas from carbide have improved greatly since the appearance of the article from which the above quotation is taken, and the immersion type is now adopted almost exclusively by all manufacturers. The first two types have been practically discarded owing to the difficulty experienced in designing them so that they fulfil the requirements of the insurance underwriters.

When placing the acetylene plant in the Bio-Chemic laboratory of the William Head Public Health Quarantine Station, Victoria, B.C., it was necessary to remodel the machine somewhat, that the Bunsen burners then manufactured could be used without difficulty, as they necessitated a constant pressure of gas that would raise a colume of water four inches. At the present time there are Bunsen burners and hot plates which work with far greater satisfaction at the normal lighting pressure of the gas (two and one-half inches) than did the burners mentioned, with their special pressure.

The connections for lighting and heating in this laboratory are the same, it not being necessary to have an increased pressure to manipulate the Bunsen or hot plate burners now in use.

The burners used for heating the various incubators and constant temperature appliances are of the 'turn-down' lighting pattern, which have the advantage of not carbonizing when used on a less consumption of gas than their rating. The ordinary lighting tips have been found to work well in some instances, but for every burner that will work well a dozen may be tried that will carbonize within a week.

It is also necessary to have the adjustment of the gas regulators perfect, owing to the small amount of this gas required as compared with ordinary coal gas, it requiring but about one-sixth the amount of acetylene to produce the same effect. To obtain this adjustment it has been found necessary to redraw some of the glass work on the improved Reichert regulator, that the gas supply may be reduced and also that the mercury seal may be accurately closed through the change in temperature.

After making the necessary changes in the regulator, it is possible to keep the incubators within half a degree at all times, provided, however, the temperature in the room where the incubator stands does not reach too great extremes. The affinity of acetylene to mercury has led to no difficulty in these regulators, a number of which have been in use for very nearly a year's time.

At one time it seemed that the presence of phosphorus in the carbide, giving phosphoretted hydrogen at the burners, was going to cause considerable trouble, but after taking some of the pieces of apparatus apart it has been found that a deposit only is formed on the copper, which deposition ceases after a time, leaving the metal much thicker and heavier.

In the use of this gas it is essential that it be supplied to the burners perfectly dry, and one of the best means of accomplishing this, is to add to the main supply pipe, just as it leaves the machine, a cylinder with removable port-holes, which may be filled with carbide from time to time. This carbide removes any moisture which passes the various scrubbers found in the machine, and is at the present time placed on the machine itself by many manufacturers.

Further than this drying, I do not consider it essential to have purifiers (provided the carbide used is of good quality) that will supply chemically pure gas.

On the whole, I consider an acetylene installation the best which can be made for general laboratory uses; as it supplies a gas which is suitable for the various heating and lighting operations required in an up-to-date bacteriological laboratory. It gives at all times an even pressure, which is an absolute necessity for the accurate running of incubators and other constant temperature appliances.

In closing this, my report, I desire to here express my appreciation of the manner in which the Chief Veterinary Inspector, Dr. J. G. Rutherford, has interested himself in the laboratory work. He has ever been ready to lend his assistance in making this Division of the Health of Animals Service more efficient, through the encouragement and advice offered from time to time.

I have the honour to be, sir,
Your obedient servant,
CHAS. H. HIGGINS,
*Pathologist.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 17.

## HEALTH OF ANIMALS.

(A. E. Moore, D.V.S.)

Ottawa, October 31, 1903.

Sir,—I have the honour to submit to you this my annual report for the year ended October 31, 1903.

### GLANDERS.

During the year I have tested with mallein 181 horses, of which 80 reacted.

The total number destroyed was 46. Seven of these were destroyed from clinical symptoms alone; 24 as reacting to the mallein test and showing clinical symptoms of glanders; 9 were killed after the second test (these developed clinical symptoms between the first and second tests), and 6 at the third test, being those that did not show an improvement in their reactions.

Of the reacting horses that do not show any clinical symptoms of glanders I have tested : 32 twice, 47 three times and 4 four times.* If these retests are added to the number of horses tested, it represents a total of 264 tests made during the year.

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*Some of the horses under my supervision were tested the second time by another inspector.

The system that Dr. Rutherford has adopted in dealing with glanders has proved to be very satisfactory in the cases with which I have dealt. Twenty-eight horses that have reacted have in the application of two, three or four tests finally ceased to react, and to all appearances are healthy and useful animals. These are all branded, however, and are still under our supervision. Of these 28 ceased reactors, 6 ceased to react at the second test, and 22 at the third or fourth tests.

I have also under supervision other horses that have been tested two or three times which are likely to become ceased reactors.

This system has been very instructive in demonstrating the action of mallein on glandered horses, its apparent curative effect, and the different reactions obtained in different horses.

I have examined a large number of horses clinically, at the Ottawa market on market days, and have frequently visited the large hotel stables near the market; also many large stables in other parts of this city and in Hull.

### TUBERCULOSIS.

I have tested 97 pure-bred cattle for export to the United States, 55 being from the province of Quebec and 42 from the province of Ontario. Eleven of these reacted, and were therefore permanently ear-marked and not allowed to be shipped.

I have tested 203 cattle which were not for export, 86 being in the province of Quebec and 117 in the province of Ontario. Nine of these reacted, and three were suspicious.

### HOG CHOLERA.

I have dealt with three different outbreaks of hog cholera this year, namely, at

| | | | | | |
|---|---|---|---|---|---|
| Iroquois, Ont.... | 1 farm, | 15 hogs on premises, | 13 infected, | 11 died, | 4 destroyed |
| Sudbury, Ont. .. | 3 " | 75 " | 73 " | 64 " | 11 " |
| Copper Cliff, Ont. | 1 " | 24 " | 23 " | 21 " | 3 " |
| | 5 " | | 109 " | 96 " | 18 " |

These outbreaks were not reported promptly to the department, and it will be noticed that a large number of hogs died before my arrival.

I also visited two farms at Sault Ste. Marie and two farms at Niagara Falls, where hog cholera had existed, for the purpose of inspecting the premises regarding the disinfection.

### SUSPECTED HOG CHOLERA.

I also visited many farms where hog cholera was suspected to exist, but found sickness due to either injudicious feeding or to bad hygienic surroundings; usually both these conditions combined. Verminous bronchitis, intestinal worms, pneumonia, gastritis and enteritis were some of the diseases seen.

### ANTHRAX.

On January 5 I visited Cap St. Ignace, P.Q., to investigate a disease in cattle, which disease I found to be anthrax. Eighteen cattle, nearly all cows, died within a few weeks in one locality on five different farms. These farms were all joining, and I am of the opinion that the disease was spread by means of the carcasses which were allowed to lie about. I ordered all carcasses burned, and the stables disinfected.

### BLACK QUARTER.

Three outbreaks of this disease came to my notice during the year, namely:

| | | |
|---|---|---|
| Lisgar, Que | 1 farm | 8 young cattle died |
| St. Hyacinthe, Que | 1 " | 3 " |
| Bryson, Que | 2 " | 8 " |

I advised a change of pasture when possible, and the vaccination of the remaining young cattle with blacklegine.

### SHEEP SCAB.

I have dealt with one outbreak of this disease. A carload of lambs bought at the Western cattle market, Toronto, in November, 1902, were shipped to Cayuga, Ont., to be fattened. A few weeks after their arrival the owner noticed a skin disease, and called in the local veterinarian, Dr. Brandreth, who suspected scab. I visited Cayuga in January, 1903, and found 203 lambs, nearly all of which showed symptoms of scab. Four very bad cases I ordered killed. Of the remaining lot some were killed and dressed on the premises, and the rest were successfully dipped.

### MANGE IN HORSES.

I discovered two cases of mange in horses on the street in this city. I immediately quarantined them, and ordered the owner to treat them, and to disinfect the stable. They were very bad cases, but were finally cured, and the stable was properly disinfected.

### TYPHOID INFLUENZA.

During the latter part of October it was reported that there was a disease among horses in the city of Kingston, Ont., and vicinity. Acting on instructions, I visited Kingston, and called on Dr. Nichols, V.S., with whom I visited several cases which he had under treatment. All of these presented the characteristic symptoms of typhoid influenza. The disease was quite prevalent in this section this summer. Dr. Massie, V.S., informed me, however, that this malady has prevailed here for some years.

### A DISEASE RESEMBLING HAEMORRHAGIC SEPTICAEMIA IN CATTLE.

Acting on instructions, I visited the neighbourhood of Bury, P.Q., on September 9, for the purpose of making another investigation regarding the disease in cattle which made its appearance again this year. I performed a post-mortem on a cow that had recently died, but was unable to obtain reliable material for the pathologist. The lesions found certainly resembled those seen in haemorrhagic septicaemia. Dr. Higgins is still carrying on experiments with material furnished from this outbreak, but up to the present time the bacillus of this disease has not been identified.

I was informed by Drs. Tracy of Sherbrooke and Taylor of Sawyerville, who were present at this post-mortem, that these lesions corresponded with those found by them in cattle that died presenting similar symptoms previous to my visit.

### CRACKED HEELS IN COWS.

In September it was reported that cattle at North Bay, Ont., were suffering from severe foot disease. According to the above information, I visited North Bay, and found the trouble to be due to cracked heels. There were a number of family cows affected which were pastured in one field, and by all appearances this condition was due to irritation from mud. A few other similar cases were reported to me by farmers in the vicinity of North Bay.

At the time of my visit nearly all the cows were recovering, the cracks healing usually without treatment. There were no deaths.

### STOCK YARDS.

Acting on instructions, I visited and inspected the Canadian Pacific Railway stock yards at Fort William, Schreiber, North Bay and Mattawa. Some changes were found necessary for the better accommodation and comfort of stock. I am pleased to state that the company have carried out our suggestions in a very satisfactory manner. New yards have been built at North Bay, and the Schreiber yards have been put in a much better condition.

### REGARDING THE PREVENTION OF FOOT AND MOUTH DISEASE FROM THE NEW ENGLAND STATES.

In December, on instructions from the Chief Inspector, I visited some of the ports along the boundary of Vermont, for the purpose of warning customs officers regarding the prevention of the introduction of foot and mouth disease into Canada from the New England States. I visited the following places: Lacolle, St. Armand, Frelighsburg, Abercorn, Mansonville and Cookshire. The officers at each of these ports were very willing to co-operate with our department. Extra precautions were taken to prevent the movement of ruminants and swine across the boundary at all points.

I have the honour to be, sir.
Your obedient servant,
A. E. MOORE,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 18.

### (M. C. BAKER, D.V.S.)

MONTREAL, October 31, 1903.

SIR,—I have the honour to submit my report for the past year.

During the year there were inspected and passed for shipment at the Canadian Pacific Railway stock yards 84.583 head of cattle. and 29.079 sheep, distributed as follows :—

| | Cattle. | Sheep. |
|---|---|---|
| November, 1902 | 5,687 | 4,410 |
| May, 1903 | 10,055 | 805 |
| June, 1903 | 10,910 | 3.063 |
| July, 1903 | 14,775 | 2.974 |
| August, 1903 | 15,840 | 6,017 |
| September, 1903 | 16.542 | 4.341 |
| October, 1903 | 10,774 | 7.769 |
| Total | 84.583 | 29,079 |

Of these 16.795 head of cattle were from the United States, and 65 from Mexico; all the sheep and the balance of the cattle, 67.723 head. were Canadian.

There being no facilities for inspecting and marking cattle for export at Quebec or Three Rivers, cattle to be loaded at these ports are inspected and marked here, so as to admit of their being loaded on board ship on arrival. 6,199 head of cattle and 1,427 sheep included above were loaded at Quebec, and 152 head of cattle at Three Rivers.

During the year there were rejected as unfit for shipment 146 head of cattle and 49 sheep.

Most of these animals were suffering from lameness or injuries. Three were affected with actinomycosis (the smallest number in 25 years); 2 were blind; 4, emaciation and general unthriftiness, and 1 tuberculosis.

The number of cattle inspected this year is very much greater than in any previous year, and the quality of the cattle has been generally good, specially the cattle from Ontario during August, September and October; they were even better than those shipped earlier in the season, and all remarkably free from disease.

In the month of July, acting on instructions received from the Chief Veterinary Inspector, I visited St. Armand and Granby to investigate reported outbreaks of contagious disease among cattle, but found the disease due to local causes, and not contagious.

In September I tested one bull with tuberculin for export to the United States.

I have the honour to be, sir,
Your obedient servant,
M. C. BAKER,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 19.

(CHAS. MCEACHRAN, D.V.S.)

MONTREAL, October 31, 1903.

SIR,—I beg to report that during the year commencing November 1, 1902, and ending October 31, 1903, there were inspected, found free from disease and shipped from the port of Montreal to Great Britain, 432 head of horses. Four horses were held back, viz., 3 suffering from strangles and 1 from influenza. During October of this year 64 head of horses were inspected, found healthy and shipped from this port to South Africa.

There were imported to Canada during the year via the port of Montreal, 288 head of horses, viz., 228 stallions, 59 mares and 1 gelding. All were inspected, and allowed to go forward to their destinations.

I have the honour to be, sir,
Your obedient servant,
CHARLES McEACHRAN,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 20.

## REPORT OF VETERINARIAN INSPECTOR AT MONTREAL.

(B. A. Sugden, D.V.S.)

Montreal, October 31, 1903.

Sir,—I have the honour to report to you the number of cattle and sheep that have been inspected and passed for shipment at the Grand Trunk stock yards, Montreal, during the period extending from November 1, 1902, to October 31, 1903.

The monthly shipments have been as follows :—

| Month. | Canadian cattle. | U.S. cattle. | Canadian sheep. | U.S. sheep. |
|---|---|---|---|---|
| November, 1902 | 5,891 | .... | 4,970 | |
| May, 1903 | 7,237 | 7,753 | 547 | 963 |
| June, " | 7,275 | 6,334 | 3,339 | |
| July, " | 8,313 | 4,751 | 10,804 | 157 |
| August, " | 5,601 | 3,070 | 2,826 | 150 |
| September " | 5,900 | 1,784 | 2,925 | 148 |
| October " | 5,730 | 630 | 5,757 | 305 |
| Total Canadian | 45,947 | 24,322 | 31,168 | 1,723 |
| Total United States | 24,322 | .... | 1,723 | |
| Total cattle and sheep | 70,269 | .... | 32,891 | |

Included in the above figures are 320 United States cattle and 800 Canadian sheep inspected in Montreal and shipped at Quebec.

During the season 134 cattle and 85 sheep were rejected. With the exception of 4 cattle, suffering from actinomycosis, there was no suspicion of contagious or infectious disease, the rejected animals all suffering from sore feet or injuries received during transportation. Many of these made recovery, and were eventually passed for shipment.

I have the honour to be, sir,

Your obedient servant,

B. A. SUGDEN.

*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 21.

(J. H. Frink, V.S.)

St. John, N.B., October 31, 1903.

Sir,—I beg to submit my annual report in connection with this station.

### *Inspection of Live Stock for Export.*

The number of cattle inspected for export was materially increased, owing to the British embargo against New England shipping ports. All animals were subjected to a close inspection. Any animal showing lameness or being any way footsore was not allowed on shipboard. The work of inspection during the greater part of the season was much facilitated owing to the anxiety and interest manifested by shippers, who were eager that nothing should go on board which might in any way militate against the trade. Complaint reached me in an official way that one steamship line had reported that injured and foot-sore animals had been allowed to go on board, and that it had become necessary to destroy these animals on the voyage through humane motives. The evidence submitted should have disproved the statements made. Considerable injury is not infrequently committed after the animals leave the stock yard, and in nearly every case undue haste and hurry is exercised in the loading of cattle. The cost of loading is a mere trifle in comparison with other cargo, as the animals walk or more frequently run on board under pressure. Four or five hundred cattle are frequently loaded in this way in an hour and a half or two hours.. If they were loaded in a more moderate way, and secured by the head ropes in their places as quickly as placed on board, not leaving the whole shipment as a struggling mass, between decks, until such time as it is found convenient to tie them, it would be much better for the animals, and to the interests of all concerned in them. With the exception of a few cases of actinomycosis, and some suspected cases of mange in a carload of distillery bulls, there was no evidence of contagious disease in any of the cattle inspected. In regard to sheep: in several shipments animals were observed which gave strong evidence of having been affected with scab, and having been successfully treated; notwithstanding this, these animals were detained and slaughtered. These sheep were traced to the Toronto markets. Although there were no active symptoms of scab, it was thought desirable to have the stock cars containing these sheep cleansed and disinfected.

| | |
|---|---|
| Total number of cattle inspected | 31,721 |
| Total number of sheep inspected | 13,323 |
| Total number of horses inspected | 99 |
| Total | 45,143 |

Of this number, 7,763 were United States cattle, and 1,201 sheep.

Two shiploads of cattle inspected here were afterwards loaded at Halifax, N.S., owing to vessel having sailed previous to arrival of stock.

The total numbers of animals rejected for shipment were 75 cattle and 56 sheep. Five cattle were rejected for actinomycosis; six were condemned for extensive skin disease (suspected mange); the remainder were condemned for lameness and injury. Three cattle died in the yards from intestinal disorders.

I have again to call attention to the great prevalence of ophthalmia among sheep arriving at the stock yards for export during the winter months. The great majority of them are blind, or partially blind, and they must suffer a great deal, and with it loss in weight and general deterioration in value. Strangely enough, United States sheep, although travelling much longer distances than Canadian sheep, never have ophthalmia when unloaded. This may be accounted for in part by the fact that the bulk of the United States export sheep are cross-bred merinos, and in them the eyes are not prominent, and the skin on the cheeks and surrounding the eyelids is very loose and lying in folds, which may afford some protection. I am firmly convinced that a considerable loss is inflicted on the shippers of sheep from this cause, and there should be some remedy.

### *Export to the United States.*

Twenty-five head of milch cattle were inspected, and tested with tuberculin, for export to the United States. Two animals were detained as suspicious, re-tested after being quarantined three months, and were found free.

### *Importation of Live Stock from Great Britain.*

Cattle.—Five head of Galloway cattle were imported from Scotland, owned by Messrs. J. E. Cochrane and Wm. Martin, Winnipeg. These animals were detained in quarantine ninety days, and were discharged in good health.

Sheep.—Six head of Cheviot sheep imported by Mr. F. E. Caine, of Charlotte county, N.B., were quarantined fifteen days, and were discharged in good health.

Horses.—Eighteen horses were imported, and having been inspected and found healthy were allowed to proceed; the names of importers being:—

H. W. Husband, Winnipeg, (1) Thoroughbred.
J. Colquhoun, Stratford, Ont., (8) Clydesdales.
W. N. Montgomerie, Cookshire, P.Q., (2) Thoroughbreds.
Dalgetty Bros., London, Ont., (3) Clydesdales.
Wm. Mahar, Tilsonburg, Ont., (1) Clydesdale.
Wm. Agnew, Russell, Ont., (1) Clydesdale.
O. McBride, Qu'Appelle, N.W.T., (2) Clydesdales.

1902—Nov. 19.—One sheep, imported from State of New York, consigned to Dominion Express Company, and allowed to proceed.

### *Inspection.*

An investigation was made into a report, alleging that symptoms suggesting foot and mouth disease existed among a herd of cattle in King's county, N.B. There was not the slightest foundation for such report, as the animals were found in good health.

I have the honour to be, sir,
Your obedient servant,
JAMES H. FRINK,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 22.

(Wm. Jakeman, D.V.S.)

Halifax, N.S., October 31, 1903.

Sir,—I beg leave to submit the following statements of animals inspected by me during the past twelve months.

On instructions from the Chief Veterinary Inspector, March 13, 1903, I visited a farm at Grand Pré, N.S., and examined a herd of cattle for tuberculosis.

On receipt of letter from the Chief Veterinary Inspector, April 21, 1903, I visited a farm at Tracadie, N.S., and tested a herd of cattle for tuberculosis.

On instructions by telegram from the Chief Veterinary Inspector, July 4, 1903, I visited a farm at Aylesford, N.S., to investigate a disease. Found one heifer died of black-leg; had her carcass burned, and all necessary precautions taken to prevent the disease spreading.

Exports from Halifax to the following countries:—

| —— | Cattle. | Horses. | Sheep. | Swine. |
|---|---|---|---|---|
| Great Britain | 4,014 | 17 | 426 | |
| Bermuda | 15 | 60 | 736 | 3 |
| West Indies | 11 | 18 | 709 | 5 |
| Newfoundland | 3 | 1 | 18 | 7 |
| United States | | 1 | | |
| Total | 4,043 | 97 | 1,888 | 15 |

Importations at Halifax from the following countries:—

| —— | Cattle. | Horses. | Sheep. |
|---|---|---|---|
| Great Britain | 9 | 3 | 6 |
| United States | | 12 | |
| Newfoundland | | 1 | |
| Total | 9 | 16 | 6 |

I have the honour to be, sir,
Your obedient servant,
WM. JAKEMAN,
Inspector.

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 23.

(ANDREW A. LECKIE, M.R.C.V.S.)

CHARLOTTETOWN, P.E.I., October 31, 1903.

SIR,—The following is a report of all live stock examined at this port for year commencing November 1, 1902, and ending October 31, 1903.

Statement of Animals exported.

| —— | Horses. | Cattle. | Sheep. | Swine. |
|---|---|---|---|---|
| Total for Nov., 1902 | 17 | 96 | 309 | |
| " " Dec., 1902 | ........ | 43 | 1302 | |
| " " April, 1903 | ........ | 124 | 52 | 54 |
| " " May, 1903 | 8 | 253 | 124 | 10 |
| " " June, 1903 | 10 | 159 | 329 | |
| " " July, 1903 | 3 | 269 | 403 | |
| " " August, 1903 | 3 | 104 | 297 | |
| " " Sept., 1903 | 7 | 69 | 287 | |
| " " Oct., 1903 | 9 | 14 | 556 | |
| Total export for year | 57 | 1,131 | 3,659 | 64 |

The importations were small.

One Standard-bred mare, imported by H. McLeod, Esq., from United States in November, 1902.

Six Suffolk sheep, imported by Lane Bros., from England.

This comprises a full report of work at this port.

I have the honour to be, sir,
Your obedient servant,
ANDREW A. LECKIE,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 24.

(J. A. COUTURE, D.V.S.)

QUEBEC, P.Q., October 31, 1903.

SIR,—I have the honour to send my annual report of live stock imported into Canada through this quarantine station from November 1, 1902, to October 31, 1903.

During these twelve months we have received 245 cattle, 231 sheep, 124 pigs and 93 goats, being a total of 693 animals, against 438 cattle, 368 sheep, 94 pigs, 13 goats, a total of 913 animals for the corresponding period of 1901-1902.

There is a decrease for this year of 193 cattle and 137 sheep, and an increase of 30 pigs and 80 goats.

The various breeds of animals imported are represented as follows:—

| | | |
|---|---|---|
| **CATTLE.** | | |
| Shorthorns | 184 | |
| Ayrshires | 36 | |
| Holsteins | 15 | |
| West Highland | 10 | |
| | | 245 |
| **SHEEP.** | | |
| Shropshires | 72 | |
| Rambouillet | 47 | |
| Hampshire Downs | 29 | |
| Oxfords | 28 | |
| Cotswolds | 25 | |
| South Downs | 19 | |
| Lincolns | 7 | |
| Leicesters | 3 | |
| Dorsets | 1 | |
| | | 231 |
| **PIGS.** | | |
| Yorkshires | 114 | |
| Berkshires | 7 | |
| Tamworths | 3 | |
| | | 124 |
| **GOATS.** | | |
| Murcienne | 2 | |
| Nubienne | 1 | |
| Maltaise | 6 | |
| Taggenburg | 20 | |
| Alpine | 46 | |
| Saanen | 18 | |
| | | 93 |
| Total | | 693 |

Out of the 245 head of cattle imported, 230 were for Canada and 15 were for the United States.

Out of the 231 sheep that came to this station, 128 were for Canada and 103 were for the United States.

Of the 124 pigs which entered into quarantine, 118 were for Canada and 6 were for the United States.

All the goats were for Canada.

I have the honour to be, sir,
Your obedient servant,
J. A. COUTURE,
*Superintendent.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 25.

(W. H. Pethick, V.S.)

Antigonish, N.S., October 31, 1903.

Sir,—I have the honour to submit a short summary of my work for the year ending October 31, 1903.

I have pleasure in stating that the general health of live stock in Prince Edward Island has been good, and that no contagious disease (except tuberculosis) has existed in the province during the year. Reported outbreaks of hog cholera were found, upon careful post-mortem examinations, to be diseases of a non-contagious character, and generally the result of improper care or feeding.

I regret exceedingly to have to say that Dr. Rutherford's personal investigation on the spot, as well as Dr. Higgins' examination of material from autopsics held by me, confirm my opinion, already known to you, that Pictou cattle disease (hepatic cirrhosis) exists in a limited area east of the town of Souris, in King's county. I have also reason to fear that the same disease is accountable for the loss of both horses and cattle near the town of Alberton, in Prince county. As I have had the privilege of discussing the subject with the Chief Veterinary Inspector during his several visits, and as he has very fully looked into the matter himself, it will perhaps be out of place for me to deal with the subject further than to say that the people of Prince Edward Island, together with their fellow sufferers, through this mysterious disease, in eastern Nova Scotia, are deeply interested in the exhaustive experiments decided upon by Dr. Rutherford, and which I trust soon to have in train at your experimental station at Antigonish, and I sincerely join with them in the hope that the true nature and cause of the disease may be discovered, so that preventive measures may be advised.

During the outbreak of foot and mouth disease in the New England States, the Chief Inspector stationed me at McAdam Junction, and intrusted me with the inspection of the quarantine regulations along the St. John river frontier, and I wish to express my thanks to the customs officers along the border for their energetic and kind co-operation.

During January and February I was engaged in dealing with an outbreak of hog cholera at Grand Pabos, Gaspé county, Quebec. We were fortunate in being able to stamp out the disease without much loss. I visited the locality again in May, and attended to the more thorough disinfection of some premises which the deep snow of winter had rendered impossible during my former visits.

I was much pleased to notice that in response to Dr. Rutherford's advice, the parish councils have prohibited the dangerous and unprofitable practice of allowing hogs to run at large on the highways and sea beaches.

My absence from Prince Edward Island during the greater part of the season, when cattle are usually shipped to foreign ports, will account for the limited number of examinations made by me, the inspector at Charlottetown doing most of the work.

On September 1, I received your letter, transferring me to Antigonish, N.S. My employment since that date has been chiefly the supervision of the various matters connected with the fitting out of the experiment station at Cloverville. Reports, in detail, of the progress made have been forwarded to you weekly.

I have the honour to be, sir,
Your obedient servant,
W. H. PETHICK,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa

## No. 26.

(George Townsend, V.S.)

New Glasgow, N.S., October 31, 1903.

Sir,—I have the honour to submit my annual report to you for the year. There is very little I can add. Of the 136 cases, 89 were in Pictou and 47 in Antigonish county. The most of the Pictou ones were on the eastern border line. Taking Arisaig as a centre, 57 cases occurred within a radius of eight miles.

Statement of cattle slaughtered and compensation paid from November 1, 1902, to October 31, 1903.

| Month. | Number Slaughtered. | Amount paid. |
|---|---|---|
| | | $ cts. |
| November, 1902 | 8 | 61 00 |
| December, 1902 | 4 | 14 66 |
| January, 1903 | 3 | 15 00 |
| February " | 3 | 30 00 |
| March " | 6 | 50 00 |
| April " | 4 | 35 00 |
| May " | 11 | 93 33 |
| June " | 28 | 243 33 |
| July " | 36 | 303 66 |
| August " | 23 | 214 00 |
| September " | 8 | 56 00 |
| October " | 7 | 67 00 |
| Total | 141 | 1,182 98 |

I have the honour to be, sir,
Your obedient servant,
GEORGE TOWNSEND,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 27.

(V. T. D'Aubigny, M.V.)

Terrebonne, Que., October 31, 1903.

Sir,—I have the honour to submit to you my report of visits paid, inspections made and meetings held at the request of the Chief Veterinary Inspector, from November 1, 1902, to October 31, 1903. I have submitted to the tuberculin test 207 cattle. Of these, 5 gave a reaction. On March 5, 1903, I addressed a meeting of farmers at St. Ignace de Montmagny, Que., on the subject of infectious and contagious diseases, including anthrax and black-quarter. I made a number of visits to different farms to investigate the deaths of several animals, and in each case I explained to the owners how they should dispose of the carcasses of animals which had died of disease, and the precautions they should take. I also informed them of the provisions of the Animal Contagious Diseases' Act, 1903, which they admit to be a beneficial enactment.

I have the honour to be, sir,
Your obedient servant,
V. T. D'AUBIGNY,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 28.

(John D. Duchêne, D.V.S.)

Quebec, Que., October 31, 1903.

Sir,—I have the honour to submit to you the following report of work done by me during the year ended October 31, 1903.

I have tested by mallein 29 horses, of which 15 horses have reacted; 11 have been destroyed; 3 cured by the injection of mallein, and 1 is on treatment, with good hopes of recovery.

I have the honour to be, sir,
Your obedient servant,
JOHN D. DUCHENE,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 29.

(Professor Andrew Smith, F.R.C.V.S.)

Toronto, Ont., October 31, 1903.

Sir,—I have the honour to submit the following brief report on the health of the domestic animals in Ontario during the past year.

### HORSES.

Influenza and strangles have occurred to some extent in the early part of the year, but not so much as last year. Two horses were found to be affected with glanders; they were destroyed, and the stables disinfected.

### CATTLE.

There have been no evidences of enzootic and epizootic diseases among cattle. They have been generally healthy.

### SWINE.

There have been one or two outbreaks of hog cholera in this locality, and several of hog cholera and swine plague in the western part of the province. These have been promptly dealt with.

I have the honour to be, sir,
Your obedient servant,
ANDREW SMITH, F.R.C.V.S.,
*Chief Ontario Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 30.

(T. E. Watson, V.S.)

Niagara Falls South, Ont., October 31, 1903.

Sir,—I have the honour to report that very few diseases of a contagious character have occurred amongst the domestic animals during the past year.

Sheep scab made its appearance on one farm, and a few animals died or were in a dying condition when my attention was called to the matter, but by proper care and treatment it seems to have entirely disappeared.

During the months of May and June hog cholera made its appearance on four farms in the township of Stamford. I had all the hogs on these farms destroyed, and the premises thoroughly disinfected.

The following animals entering Canada from the United States were inspected and quarantined during the past twelve months. They were all found healthy, and forwarded to their destinations:—

| | |
|---|---|
| Cattle | 127 |
| Sheep | 27 |
| Hogs | 28 |

I have the honour to be, sir,
Your obedient servant,
T. E. WATSON,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 31.

(Geo. W. Orchard, V.S.)

Windsor, Ont., October 31, 1903.

Sir,—I have the honour to submit my report of work done for the Department of Agriculture from November 1, 1902, to October 31, 1903.

In addition to performing my duties as superintendent of the animal quarantine station here, I have slaughtered hogs for hog cholera, inspected and quarantined farms for the same disease, and have inspected many carloads of animals for shipment. The following animals have been inspected by me during the year:—

FOR EXPORT.

| | |
|---|---|
| Cattle | 1 |
| Sheep | 7 |

FOR IMPORT.

| | |
|---|---|
| Cattle | 36 |
| Horses | 16 |
| Sheep | 1 |
| Swine | 6 |

I have the honour to be, sir,
Your obedient servant,
GEO. W. ORCHARD,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 32.

(Arthur Brown, V.S.)

Sarnia, Ont., October 31, 1903.

Sir,—I have the honour to submit my report of cattle and swine received into the Ontario cattle quarantine at Point Edward, from November 1, 1902, to October 31, 1903. The swine imported were of good quality.

There have been no diseased animals in the quarantine this year, and I may state that no contagious disease exists in this district, with the exception of some cases of tuberculosis and actinomycosis.

The following is a statement of the animals received into quarantine; also cattle that were imported for breeding purposes that did not require to be placed in quarantine during this period:—

| | |
|---|---|
| Cattle | 41 |
| Sheep | 224 |
| Swine | 19 |

I was instructed to visit a farm in the township of Adelaide, on September 29: Supposed outbreak of hog cholera. When I arrived 8 of the pigs were dead and buried, the symptoms being very much like cholera. I had the remaining hogs destroyed, and the farm placed under quarantine.

During the past eight months I have examined a great many stock cars coming from the United States, and have found the most of them in a satisfactory condition.

I have the honour to be, sir,
Your obedient servant,
ARTHUR BROWN, V.S.,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 33.

(J. H. Tennent, V.S.)

London, Ont., October 31, 1903.

Sir,—I have the honour to submit my annual report for the year ending October 31, 1903.

The first three months I had charge of the outbreak of hog cholera in Kent county. I was ably assisted by Drs. Perdue, Orchard, Kime and Thorne. During that time we had destroyed on 72 farms 2,584 hogs; held post-mortem on each hog; found 2,261 diseased and 323 in contact.

November 9, received instructions to make farm to farm inspection of Camden township, to ascertain if hog cholera existed in the township. Assisted by Drs. Perdue and Orchard, we did so, and found no cases of hog cholera in Camden. I recommended that Camden be released of quarantine.

February 12, visited Drumbo to investigate reported cases of glanders. Tested with mallein five horses; all proved to be affected; had them destroyed and deeply buried. Had mangers, partitions and flooring of stable taken out and burned, the remainder of the stable cleansed, disinfected and white washed with lime, the harness cleansed and disinfected, and the place quarantined.

June 9, visited Pine river, in Huron county, to investigate outbreak of hog cholera. Had 387 hogs destroyed. Post-mortem revealed 289 diseased and 98 contact hogs. The disease was brought in a car of live hogs consigned from Essex county to Ripley station; a number of the sows were sold to farmers for breeding purposes, and in each case, with one exception, where they were taken hog cholera broke out, showing that the disease was of a virulent type. The different farms and feeding pens were placed under quarantine. No new cases have developed, and I am of the opinion that the disease is stamped out in this section.

June 13, visited Chatsworth to make inquiry about reported disease among cattle. After making full inquiry, and holding post-mortem, I am convinced that the disease is due to some local cause—either the feed or drinking water, or both.

June 23, visited Harrietsville. Found horse reported to have glanders. Used the mallein test, which showed that it was not affected.

July 7, visited Chesley, where it was reported that hog cholera had broken out. I held post-mortem, which proved that it was not hog cholera, but stomach and bowel trouble due to the character of the feed.

July 24, visited the Bruce peninsula to make inquiry regarding disease affecting cattle there. Found the disease to be epiozootic ophthalmia; directed the owners how to treat them. In my opinion they will all recover, with the exception of about 8 or 10, which may lose the sight of one or both eyes. There were about 200 head affected.

July 30, visited Feversham. It was reported that horses on four farms in this vicinity were suspected of having glanders. Tested them with mallein. Three of the horses proved to have glanders. Had the three horses destroyed and burned, and the usual precautions taken as to cleaning and disinfecting the premises. The farms were quarantined.

During the year I tested with tuberculin 135 head of pure-bred cattle intended for export to the United States, 8 of which reacted.

The general health of stock in this district has been good, nothing except that contained in my report having occurred.

I have the honour to be, sir,
Your obedient servant,
J. H. TENNENT,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 34.

(Wm. Stubbs, V.S.)

Caledon, Ont., October 31, 1903.

Sir,—I have the honour to submit this my annual report on the inspection of cattle in the province of Ontario from November 1, 1902, to October 31, 1903.

Acting on the instructions received from the Chief Inspector, I have tested with tuberculin 186 pure-bred cattle for export to the United States, 4 of which reacted.

For particulars with regard to the foregoing, I beg to refer you to the detailed reports which I have from time to time forwarded to your department.

On December 17, acting on instructions, I visited two farms in the township of Mulmer, county of Dufferin, said farms being then under quarantine for hog cholera, the results of which I fully reported to the department at the time.

I have the honour to be, sir,
Your obedient servant,
WILLIAM STUBBS,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 35.

(Geo. W. Higginson, V.S.)

Rockland, Ont., October 31, 1903.

Sir,—I have the honour to submit to you my annual report for the year ending October 31, 1903.

During the year I have tested with tuberculin 81 pure-bred cattle for export, 2 of which reacted, and 223 cattle not for export, 29 of which reacted. I have also tested with mallein 2 horses; 1 reacted, and was immediately destroyed, another was placed under quarantine for forty days, when he was retested and gave no reaction. On October 8, I applied the mallein test to horses at Lachute, Que., but got no reaction.

During the year I gave fifteen certificates of health for animals being exported.

I have the honour to be, sir,
Your obedient servant,
GEO. W. HIGGINSON,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 36.

(W. W. Stork, V.S.)

Brampton, Ont., October 31, 1903.

Sir,—I have the honour to submit my report for the year ending October 31, 1903.

### INSPECTION OF STOCK YARDS AND DISINFECTION OF CARS.

Since taking office with your department I have regularly visited the market at Toronto, inspecting the stock, paying special attention to sheep and hogs about to be reshipped to the country for breeding and feeding purposes. A large sum of money is at present being expended on this market, and when completed the accommodation and sanitary arrangements will no doubt be much improved. I have also paid regular visits to the new market, known as the 'Union Stock Yards,' Toronto Junction, which has recently been opened for general business. The facilities for handling stock and the sanitary equipment are first class. I have spent considerable time looking after the disinfection and cleaning of cars at different points, and am able to report that the railway companies are executing this important duty in a more systematic way than formerly.

### DISEASE IN HOGS.

I have made a large number of investigations where disease in hogs was reported, and a large percentage turned out to be caused by injudicious feeding, the practice of feeding buckwheat to young hogs being a common cause of intestinal derangement. I have to report the outbreak of cholera at Toronto township, Peel county, Etobicoke township, West York, Gwillimbury township, North York and Collingwood township, Grey county. Sections of tissue from suspected animals were in each of these cases submitted to your bacteriologist, and the presence of disease demonstrated. Prompt measures were taken, the animals slaughtered and cremated, and I am pleased to report that with one exception the disease was confined to the place of origin. The one exception was where a brood sow was shipped some two weeks prior to the outbreak, and on becoming aware of the nature of the trouble, and the shipment, I followed the case up, to find that the sow had succumbed shortly after her arrival, but not before having conveyed the contagion, which necessitated the slaughter of the hogs with which she had come in contact.

### SCAB IN SHEEP.

I have to report having quarantined eleven contiguous farms in the township of Guelph, county of Wellington, owing to the presence of scab. The animals belonging to the different owners mingled with one another on the highway, thus accounting for the presence of the trouble on so many different farms. Repeated washing and dipping has had the effect of eradicating the trouble. Two other small outbreaks of scab, one in the county of Haldimand, and one in the county of Ontario, were also dealt with.

By orders from your department, I examined a number of Galloway bulls, purchased in Ontario for shipment to the Indian Department, N.W.T., and found them to be in good condition, and looking like thrifty animals.

### GLANDERS.

During the year I have dealt with two cases of glanders, one at Rockwood, Ont., and one near Oshawa, Ont. Both animals showed the characteristic symptoms of the disease, and reacted to the mallein test. They were both slaughtered, and their carcasses properly disposed of. In neither case was I able to account for the source of contagion.

I have the honour to be, sir,
Your obedient servant,
W. W. STORK,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 37.

### (M. B. PERDUE, V.S.)

CHATHAM, ONT., October 31, 1903.

SIR,—I beg to submit herewith my annual report for the year ending October 31, 1903.

The disease most prevalent, and, in fact, almost the only infectious disease among animals in this district, is hog cholera.

During the year I have dealt with 75 outbreaks of hog cholera, involving the slaughter of 1,941 hogs. Drs. Whyte and Orchard, who were ordered to Chatham to assist me during the severeness of the outbreak, dealt with cases as follows: Dr. Whyte, 23 outbreaks, involving the slaughter of 689 hogs; Dr. Orchard, 25 outbreaks, involving the slaughter of 829 hogs.

The local inspectors, Drs. Kime, Thorne and Rowe, handled, under my instructions, 84 outbreaks, involving the slaughter of 3,084 hogs.

The total number of outbreaks was 207, involving the slaughter of 6,543 hogs.

In the county of Kent the following townships are under quarantine: Tilbury East, Harwich, Raleigh, Chatham and Dover, and out of this area the shipment of fat hogs for immediate slaughter was allowed from April 1 to October 31, 1903, subject to veterinary inspection.

During this time I inspected 118 cars containing 14,748 hogs. Dr. Whyte inspected 5 cars containing 723 hogs, and the following number of cars, 161, containing 18,839 hogs, were inspected by Drs. Kime, Thorne and Rowe, making a total of 284 cars, containing 34,310 hogs, all hogs being inspected before entering the cars.

In addition to this, the other officers and myself have placed a number of farms under quarantine on suspicion, and on a number of these disease developed; the others were released later, no disease being evident. I also, under instructions from the Chief Inspector, tested 14 cattle with tuberculin, of which number one reacted to the test, and tested 19 horses with mallein, 6 of which were destroyed through reactions and showing clinical symptoms.

In November, 1902, I was instructed to investigate the cause of disease among horses in township of Tilbury North, and diagnosed the case as typho-pneumonia. Last June I was instructed to investigate a suspected outbreak of foot and mouth disease reported to the Department of Agriculture by Dr. W. J. McLaren, Highgate, Ont., and found the disease affecting the animals to be simple aphtha.

In concluding my report, I am pleased to state that the outbreak of hog cholera the past season has not been so extensive as in the previous year. This is due to the fact that the present system of dealing with the disease is proving very effective, owing largely to the valuable suggestions received from time to time by letter, and personally from the Chief Veterinary Inspector, who during his frequent visits has become thoroughly acquainted with the condition of affairs in the infected district.

I have the honour to be, sir,
Your obedient servant,
M. B. PERDUE.
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 38.

(Jos. Kime, Jr., V.S.)

Chatham, Ont., October 31, 1903.

Sir,—I have the honour to submit the following report of the work done by me during the past year from November 1, 1902, to October 31, 1903.

Hog cholera has prevailed in this district to a considerable extent, covering a large area of territory in the district under quarantine.

Cattle in this district are apparently healthy; no disease of serious nature exists.

The work performed by me for the department during the period above mentioned included the slaughter of hogs on 72 farms, the inspection of 80 carloads of hogs, and the inspection of 124 farms to ascertain whether cleansing and disinfecting orders had been carried out.

I have the honour to be, sir,
Your obedient servant,
JOS. KIME, Jr.,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 39.

(J. R. Thorne, V.S.)

Wallaceburg, Ont., October 31, 1903.

Sir,—I beg to report that during the year ended on October 31, 1903, there has been almost no disease among domestic animals in this district other than swine plague or hog cholera, which has occurred in nearly every month of the year. There have been outbreaks on 36 farms or other premises in the townships of Camden, Chatham, Dover, Sombra, and the town of Wallaceburg.

I have several times during the year visited Walpole Island, and have found conditions there about the same as they have been during the last year or two: that is, I have found no actual disease among the hogs, but on account of lack of proper care and the proximity of the island to the State of Michigan, I would recommend no change in the regulations.

I have also reason to believe that the farmers and hog raisers are not as prompt in reporting the outbreak of the disease as they should be, and thus allow many animals in a large scope of territory to become infected. I would therefore recommend a more careful investigation of the source of contagion, and an inspection of all farms in an infected district.

I have the honour to be, sir,
Your obedient servant,
J. R. THORNE,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 40.

(George H. Belaire, V.S.)

Pembroke, Ont., October 31, 1903.

Sir,—I have the honour to submit to you my report of work done for the Department of Agriculture from the time of my appointment in the month of June, 1905, until October 31, 1903.

During that time I have tested with mallein 48 horses, 25 of which reacted; 6 horses that presented well marked clinical symptoms of glanders, and which reacted to the mallein, were destroyed; 2 horses showing well marked clinical symptoms were destroyed without the application of the test, making in all 8 horses destroyed.

Nine places were placed under quarantine, 5 of which were recommended for release when I was satisfied that the places were thoroughly disinfected, and that contagious disease no longer existed; therefore there are at present 4 places under quarantine, and under close observation.

I am pleased to state that with the exception of glanders no disease of a contagious character affecting horses or other domestic animals has come directly under my notice.

The public at large are quite alive to the seriousness of the disease glanders, and in every case have given me all the information and help to carrying out the orders of the Chief Veterinary Inspector.

The manner in which horses are handled and worked no doubt is accountable to a large extent for the prevalence of glanders in this locality. The great number of horses employed in the lumber camps are hired for the winter months from farmers and others in the Upper Ottawa district, and are congregated in crowded stables, where drainage and the sanitary conditions are not the best, and returning to their homes in the spring may carry with them whatever disease or infection they have come in contact with during the winter.

The following facts cover the history of the outbreak of glanders in this district last spring: Several lots of horses were shipped to Ottawa from Pembroke, and were found on their arrival to be affected with glanders, and on inquiry it was found that the horses came from the several camps above Pembroke. In almost every case I now have on hand the disease can be traced back to these animals. The stables in which these infected horses were housed as far as is known have been visited by me, and thoroughly disinfected where possible, and in one or two cases stables have been destroyed, so that all precautions possible for the safety of horses going into the woods this winter have been taken.

I have the honour to be, sir,
Your obedient servant,
GEO. H. BELAIRE.
*Inspector.*

The Honourable
The Minister of Agriculture.
Ottawa.

## No. 41.

(Charles Little, V.S.)

Winnipeg, October 31, 1903.

Sir,—I have the honour to submit my annual report of inspections for the year ending October 31, 1903.

The following is the total number of animals imported from the United States:—

| | |
|---|---|
| Horses | 9,526 |
| Mules | 675 |
| Cattle | 3,175 |
| Sheep | 80 |
| Hogs | 395 |

I tested 36 head of pure-bred cattle for export, all of which were healthy.

The stock in Manitoba have been very healthy this year. A few small outbreaks of symptomatic anthrax have been reported, and a number of horses have died with what is known as swamp fever.

I have the honour to be, sir,
Your obedient servant,
CHAS. LITTLE,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 42.

(P. A. Robinson, V.S.)

Emerson, Man., October 31, 1903.

Sir,—Herewith I beg to submit a tabulated statement, showing number of stock of different kinds inspected by me at the ports of Emerson and Gretna, for the twelve months ending October 31, 1903. The most of this stock belongs to settlers, and was destined to points throughout the Territories.

### Inspection at Gretna, 1903.

| Month. | Horses. | Cattle. | Mules. | Hogs. |
|---|---|---|---|---|
| November,—1902 | 22 | 5 | 1 | .... |
| December " | 3 | 1 | .... | .... |
| March,—1903 | 67 | 19 | 2 | .... |
| April " | 104 | 23 | 16 | .... |
| May " | 28 | 5 | .... | 9 |
| June " | 29 | .... | .... | .... |
| July " | 9 | .... | .... | .... |
| Sept. " | 4 | .... | .... | .... |
| Totals | 266 | 53 | 19 | 9 |

### Inspection at Emerson, 1903

| Month. | Horses. | Mules. | Cattle. | Sheep. | Swine. |
|---|---|---|---|---|---|
| November,—1902 | 48 | .... | 66 | .... | 15 |
| December " | 4 | .... | 10 | .... | .... |
| January,—1903 | 4 | .... | .... | .... | .... |
| February " | .... | .... | .... | .... | .... |
| March " | 85 | 6 | 57 | 13 | 15 |
| April " | 57 | 2 | 80 | 12 | 2 |
| May " | 37 | .... | 63 | .... | 4 |
| June " | 125 | .... | 247 | 17 | .... |
| July " | 102 | 2 | 2 | .... | .... |
| August " | 25 | .... | 23 | 6 | 1 |
| September " | 177 | .... | 40 | .... | .... |
| October " | 30 | .... | 177 | .... | .... |
| Totals | 694 | 10 | 765 | 48 | 37 |

I have the honour to be, sir,
Your obedient servant,
P. A. ROBINSON,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 43.

(R. D. Scurfield, M.D.V.)

Crystal City, October 31, 1903.,

Sir,—I have the honour to submit to you as per annexed report the amount of stock inspected by me at the ports of Crystal City and Snowflake, for the year ending October 31, 1903:—

Horses, 872; mules, 2; cattle, 704; sheep, 29; swine, 116.

I have the honour to be, sir,
Your obedient servant,
R. D. SCURFIELD,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 44.

(W. Little, V.S.)

Boissevain, October 31, 1903

Sir,—I have the honour to submit the following report of animals inspected by met at Deloraine, Man., and Killareny, Man., during the year ending October 31, 1903.

Animals inspected at Deloraine:—

| | |
|---|---|
| Horses | 660 |
| Mules | 5 |
| Cattle | 408 |
| Swine | 4 |

Of the above 233 horses were for sale; 427 horses, 408 cattle, 5 mules and 4 swine were settlers' effects.

Animals inspected at Killarney:—

| | |
|---|---|
| Horses | 245 |
| Mules | 5 |
| Cattle | 154 |
| Sheep | 3 |
| Swine | 11 |

Of the above, 38 horse were for sale; the balance and all other animals were settlers' effects.

I have the honour to be, sir,
Your obedient servant,
W. LITTLE,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 45.

(R. E. Monteith, V.S.).

Killarney, Man., October 31, 1903.

Sir,—I have the honour to submit the following report of animals inspected by me during the period from May 22 to September 14, 1903:—313 horses, 95 cattle, and 40 swine, all found healthy and of average quality. Of the above 144 horses were for sale; the balance of animals settlers' effects.

I have the honour to be, sir,
Your obedient servant,
R. E. MONTEITH,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 46.

## COMMISSIONER OF NORTH-WEST MOUNTED POLICE.

(A. Bowen Perry.)

Regina, Assa., October 31, 1903.

Sir,—I have the honour to forward my annual report for the twelve months ended October 31, 1903, together with the reports covering the same period of the various veterinary inspectors, which give in detail the work performed by them.

| | |
|---|---|
| Insp. Burnett, V.S., | Macleod District. |
| Staff-Sergt. Mitchell, V.S., | Regina District. |
| Staff-Sergt. Perry, V.S., | Wood Mountain District. |
| Staff-Sergt. Richards, D.V.S., | North Portal. |
| Staff-Sergt. Coristine, V.S., | Maple Creek District. |
| J. C. Hargrave, D.V.S., | Medicine Hat District. |
| Staff-Sergt. Johnstone, V.S., | Coutts. |
| Staff-Sergt. Oliver, V.S., | Cardston. |
| Staff-Sergt. Hobbs, V.S., | Calgary District. |
| Staff-Sergt. Sweetapple, V.S., | Edmonton District. |
| Staff-Sergt. Mountford, V.S., | Prince Albert District. |

My veterinary staff at present consists of Insp. Burnett, 14 Staff-Sergeants, and Dr. Hargrave, of Medicine Hat, and are stationed as follows:—

*Ports of entry*—Wood Mountain, North Portal, Coutts and Cardston.—A veterinary inspector at each.

Maple Creek.—Also a port of entry.

Medicine Hat.—Also a port of entry.

Macleod.—Insp. Burnett, V.S.

Calgary.—Two at present. Work is very heavy during the season of cattle shipments, and, in addition, R. Riddell, V.S., has often to be called in to assist.

Fort Saskatchewan.—Includes all Edmonton District.

Prince Albert.—

Regina.—Four at present; and as a rule three are always out at work.

Dawson.—For Yukon Territory.

As you will see by the different reports, the work has increased largely during the past year. Formerly it was usual if a horse reacted to the mallein test to immediately destroy it, but for some time past, acting under instructions from the Chief Veterinary Inspector, a horse reacting to the test is not destroyed unless it also presents marked clinical symptoms. This of course entails a large increase of work on the inspectors, as many animals have to be tested several times at intervals, and results in much increased travel and extra vigilance both on the part of the veterinary inspectors and our men stationed on detachments where the quarantine regulations are to be enforced. One case is reported where a horse was tested six times, and reacted every time, but no clinical symptoms; but on the horse being destroyed, and a post-mortem held, glander tubercles were found in the lungs and in the glands within and without the thorax.

The entries of both horses and cattle at North Portal were large, and promise next season to be much larger. The horses brought in at this point were mostly of a superior type, the larger number being settlers' work horses. A large number of Mexican cattle were imported. Owing to the insufficient facilities at North Portal to handle or feed a large number of stock, I found it necessary to station a veterinary inspector at Velva, North Dakota, where there are large cattle yards. These Mexican cattle were found to be free from disease, and from reports so far received appear to be doing well, but it remains to be seen how they will stand the winter.

Since my last report I stationed a veterinary inspector at Cardston. The entries of stock amounted to 8,158 horses and 6,971 cattle.

The general health of stock has been extraordinarily good, particularly amongst cattle, a little mange in the west being really the only disease mentioned.

## HORSES.

Glanders, I regret to say, is still very prevalent in some parts of the Territories, and there is an increase in several districts as compared with last year, but it must be borne in mind that there has been a large increase in the number of horses during the past year. It is a noteworthy fact that glanders is almost unknown amongst the range horses, and is most prevalent in the thickly settled districts.

To show how easily glanders may get into the best looked after stable, I would say I bought a remount in the west apparently healthy in every way. He was brought here, broken and ridden for a couple of months, and was never away from the post. The veterinary surgeon, going his rounds one day, noticed him coughing, and treated him for a cold. A few days after, while being ridden, he began to expel blood from one nostril. Examination showed well marked ulcers. On applying the mallein test great reaction was shown, foetid discharge from nostrils, and the swelling at point of injection was very large. He stiffened up rapidly and became very dull, and was destroyed. All the horses occupying the same stable, some twenty in number, were tested, but there was no reaction in any of them. The band from which this horse was purchased was examined by a veterinary inspector, but no trace of glanders could be found, and there has not been a case of glanders in that district for the past twelve months.

The outbreak in the Red Deer district reported last year has, I am glad to report, been almost entirely stamped out by Staff-Sergt. Sweetapple.

It is very satisfactory to note that not a single case of glanders has been reported in the Maple Creek district for the past year.

The greater number of cases of glanders have occurred in Eastern Assiniboia, 1,130 horses having been examined or tested. Of these, 319 were tested and quarantined, 91 were tested and destroyed, 16 were destroyed without test, 269 tested and no reaction, 435 were examined and found free from disease, and 96 are still in quarantine. Of these tested and quarantined, there were 25 that reacted to the first test of mallein; 15 of these not reacting at the second test were released; the remaining 10 reacted on the second but not on the third test and were released.

Edmonton district ranks next in the prevalence of this disease, there having been 81 horses tested, and 45 destroyed, 15 of these being in the Red Deer country. Five horses, which reacted on the first test, failed to react on further tests and were released.

Calgary district comes next, with 27 horses destroyed, and Prince Albert district follows with 25 and 6 still in quarantine.

Maple Creek, no cases. Medicine Hat, 10 horses destroyed and 1 still in quarantine.

Lethbridge, 3 destroyed; Macleod, 1 destroyed, and Wood Mountain, no cases.

At ports of entry no glanders was discovered, except at North Portal, which had 4 cases.

I beg to append a statement, showing the number of horses destroyed for glanders in each district, as compared with last year:—

| District. | 1902. | 1903. |
|---|---|---|
| Eastern Assiniboia | 39 | 107 |
| Maple Creek, W. A. | 1 | nil. |
| Medicine Hat, W. A. | 21 | 10 |
| Lethbridge, Alta. | nil. | 3 |
| Macleod, Alta. | 3 | 1 |
| Calgary, Alta. | 11 | 27 |
| Edmonton, Alta. | 17 | 46 |
| Prince Albert, Sask. | 20 | 25 |
| | 112 | 219 |

Mange has increased amongst horses principally or nearly altogether in the west. Early in the year, this disease was found to exist in several bands of horses running west of Stair, on the north side of the South Saskatchewan river. Dr. Hargrave, under my instructions, arranged to have these horses, some 4,000 in number, rounded up, all affected animals, to be taken up and treated and none to be sold or shipped until the range was clear of this disease. The greater part of these horses were rounded up on June 25, and examined by Dr. Hargrave, who picked out 74 head as affected, two so badly that they were shot. Later on he isolated fifty more head, which with the 72 already quarantined, were treated and released by Dr. Hargrave in the latter part of July. It is estimated that about 100 mangy horses died on this range during the bad storm in May last.

At the present time, the fall horse round-up is being held in the district west of Stair and all horses collected will be thoroughly examined and report made as to their condition.

Considerable mange existed amongst horses in the Little Bow country. Insp. Burnett, V.S., visited the affected herds, quarantined them and gave directions as to treatment, with the result that the disease is practically stamped out in that district.

Staff-Sergt. Hobbs, V.S., reports mange in his district as on the increase, and has, during the past year been visiting quarantined herds. His last report states that horses belonging to five large owners are still being treated and are in quarantine.

Mange was found in a herd of horses at Rosthern in the Prince Albert District, 162 in number, which had come from the Lethbridge District. They were promptly quarantined. Forty-three have been released and one hundred and nineteen are still in quarantine.

Edmonton District reports only seven cases of mange, which have been treated and cured.

Only isolated cases have appeared in other districts.

*Anthrax.*—Two cases were reported from the Edmonton district. The bodies were burned.

*Typhoid and other fevers* appear to have been very much less prevalent than last year, mention of very few cases being reported even from the Edmonton and Prince Albert districts.

There were no other diseases amongst horses that require special mention, the only one that caused any trouble or loss being strangles, which is always more or less prevalent amongst young range stock.

### CATTLE.

Cattle have been wonderfully free from disease. Mange is by no means eradicated, but the general report is that it exists to a much less extent than in former years. Owners of cattle, as a class, are fully alive to the seriousness of the disease, and now without delay take up a diseased animal and treat it. Some of the larger owners have dipping vats, but the general rule is to treat by hand application. Amongst the shipments of export cattle 110 head were rejected for mange in the Calgary district, nine in the Macleod and Lethbridge districts, and five in the Medicine Hat district.

Veterinary inspectors have made, during the past season, systematic inspection of a large number of cattle in their respective districts, and though mange existed, it did so to a much less extent than formerly.

Insp. Burnett, V.S., at the request of the Chief Veterinary Inspector, went to Helena, Montana, to confer with the chief state veterinarians of Montana and North Dakota on the subject of the prevention and cure of this disease, and on his return proceeded to Ottawa to report to and confer with the Chief Veterinary Inspector.

*Actinomycosis.*—Insp. Burnett reports the almost total disappearance of actinomycosis on the western ranges, and I have heard but little of it from any point. Two head of cattle were refused entry at North Portal, being affected with this disease, and three rejected for export in the Medicine Hat district.

*Tuberculosis.*—Fifty-one head were examined and tested at the Experimental Farm, Indian Head, and four found affected.

One short horn bull (pure bred) was found to be affected.

*Black quarter.*—Some cases were reported from various parts of the Territories, but it was much less prevalent than in former years.

*Ophthalmia* appeared in the Edmonton district, and at some points in the Qu'Appelle valley. It is supposed to be caused by the pollen of some plant entering the eye while the animal is feeding, and appears to be merely temporary, no case of permanent blindness having come to my notice.

### SHEEP.

Sheep have been mostly very healthy. The only report of scab was amongst two small bands in the Lethbridge district. They were all dipped, and eventually slaughtered for butchers' use, without having come into contact with any other sheep.

*Tape worm.*—Dr. Hargrave reports a large loss amongst some flocks from this disease, which had made such headway before being reported that treatment was nearly useless. The loss occurred chiefly among the lambs and ewes. After the green grass started losses ceased.

*Poisoning.*—Dr. Hargrave also reports considerable loss amongst sheep during the month of May last from eating the young 'Death Camas' plants, one rancher in one night losing about 150 head out of a flock of 2,000 sheep.

### SWINE.

No disease has been reported from any point amongst swine.

STATEMENT of stock inspected for importation.

| District. | Cattle. | Horses. | Mules. | Sheep. | Swine. | Rejected. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cattle. | Horses. |
| N. Portal | 47,280 | 13,214 | 419 | 139 | 559 | 2 | 6 |
| Maple Creek | 3,129 | 3,370 | 21 | 8,269 | | | |
| Medicine Hat | 73 | 3,430 | 6 | | | | |
| Coutts | 6,971 | 8,158 | 46 | 7,919 | 174 | | |
| Cardston | 6,089 | 3,578 | | | | | |
| Wood Mountain | Nil. | 1,574 | | | | | |
| Total | 63,542 | 33,354 | 492 | 16,327 | 733 | 2 | 6 |

### INSPECTED FOR EXPORT.

Owing to climatic conditions, cattle were not in as good shipping order this year as is usual, and this, combined with the low price offered, has very materially lessened the number of cattle shipped. The following total shows the number of cattle and horses reported as inspected for shipment:—

| District. | Cattle. | Horses. | REJECTED. | |
|---|---|---|---|---|
| | | | Cattle. | Horses. |
| Wood Mountain | | 1 | | |
| Maple Creek | 4,232 | | | |
| Medicine Hat | 3,013 | 711 | 8 | 2 |
| Coutts | 839 | | | |
| Macleod | 8,707 | 2,931 | 9 | |
| Calgary | 16,555 | 2,767 | 110 | |
| Totals | 33,346 | 6,410 | 127 | 2 |

### INSPECTION FEES.

The amount collected from November 7, 1902, to November 5, 1903, was $15,113.43, which has been duly remitted to your department.

### SALE OF BLACKLEGINE.

The sum of $200 has, during the same period, been remitted as proceeds of sale of blacklegine distributed from here, and necessary outfits for administering same. A supply was sent direct from your department to Dr. Hargrave, who reports having sold same to the value of $129.20, making the total sales to equal $329.20.

Taking everything into consideration, I consider the Territories have every reason to be satisfied with the general health of stock, as, with the exception of glanders and mange amongst horses and mange amongst cattle (to a much less degree than formerly), no other disease exists to any extent, and I am using every endeavour, with the loyal assistance of my veterinary staff, to stamp out both glanders and mange, and I am glad to say that, as a rule, owners of stock appreciate the seriousness of these diseases and aid the inspectors in every way in their power.

I have the honour to be, sir,
Your obedient servant,
A. BOWEN PERRY,
*Commissioner, N.W.M. Police.*

The Honourable
The Minister of Agriculture,
Ottawa.

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MACLEOD, October 31, 1903

SIR,—I have the honour to submit herewith my annual report of work performed for the Department of Agriculture.

Apart from the outbreak of mange among horses ranging between the Old Man's and the Little Bow rivers, the general health of stock has been remarkably good. The outbreak of mange among horses referred to looked very serious for a time, but now I believe we have it under control and hope to have it thoroughly stamped out in a short time.

While cases of mange among cattle are occasionally met with, the disease is not nearly as prevalent as in former years.

A fact worthy of note is the almost entire disappearance of actinomycosis. I have only seen four cases this year, and those were evidently of long standing. I cannot account for this unless the cool wet summers of the past two years have been unfavourable for the development of the fungus.

During the month of May a very severe snow storm swept over this district, but cattle and horses on the range came through it much better than was thought at the time they would. Most stockmen were of the opinion that they would lose at least 25 per cent. Judging from my own observations, I am of the opinion that one per cent will cover the loss. The loss among sheep, I believe, was heavy; but what the number was, I have been unable to learn. The greatest loss was among stocker cattle being shipped into the country, a great number from Mexico, Manitoba and Ontario being near the end of the journey when a great storm struck them. I believe that fully 50 per cent of these perished.

I have the honour to be, sir,
Your obedient servant,
JOHN F. BURNETT.
*Inspector.*

To the Commissioner,
N.W.M. Police, Regina.

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REGINA, October 31, 1903.

SIR,—I have the honour to forward this my annual report of Depot Division, for the year ending October 31, 1903.

Obviously when one reflects on the wide extent of territory included within the limits of the quarantine staff of this division and the enormous amount of work incident to a year's operation, a report of this kind is necessarily restricted to a mere synopsis of the work actually performed. Anything in the shape of an attempt at particularizing would be impracticable, hence a detailed statement is appended (not printed) which briefly includes the individual cases that have come under the notice of the officials of the department and the action taken in each. Suffice it to say that in every instance where the suspected existence of contagious diseases has been reported, the localities in question have been visited with the least possible delay and such action taken as the regulations called for.

It might be mentioned in passing, as worthy of note, that of the many contagious diseases to which domesticated animals are subject and which accordingly are brought more or less prominently before the notice of quarantine inspectors in the course of the season's operations, in this instance, and within the scope of this report, glanders and its concomitant farcy were the only diseases of a contagious character that have come under my consideration. But for some reason—and possibly to a large extent owing to the greater influx of outside horses than heretofore—these diseases have prevailed to an unusual extent during the present season involving localities widely separated.

Another cause that might be mentioned of the dissemination of this disease is the current practice of turning work horses out on the prairie for the winter. Naturally these animals trust to their own resources, and in this way congregate in considerable bands for mutual protection, thus (assuming the disease exists in any individual) furnishing the maximum facilities for its propagation. The following spring these animals are taken up by their respective owners, and later on, when it is too late to mend, the discovery is made that they have glanders among their horses.

In the vicinity of Qu'Appelle a somewhat serious outbreak of this disease occurred, and the loss of several horses was clearly traceable to the nefarious act, on the part of two individuals, of dealing off a diseased animal. Accordingly, an information was laid against the offenders before a justice of the peace for an infraction of the provisions of "The Animal Contagious Diseases Act," and though a conviction was not secured, nevertheless a salutary effect was produced on the mind of the community.

I have the honour to be, sir,
Your obedient servant,
W. MITCHELL, V.S.,
*Veterinary Staff-Sergt.*

The Officer Commanding
Regina District, Regina.

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WOOD MOUNTAIN, October 31, 1903.

SIR,—I have the honour to forward you the annual report of work done for the Department of Agriculture for the year ending October 31, 1903.

I am pleased to be able to state that there have been no cases of glanders in the district, and all horses entered for duty here have received a very close inspection for this disease.

Black quarter has been much less prevalent than in former years, due no doubt to the more extensive use of preventive inoculation.

Mr. Thompson, of Elm Springs, had an outbreak of enzootic catarrhal conjunctivitis in his herd of cattle. The disease readily subsided on his changing the pasturage from the low lying meadows to the hills.

Mr. Mullett, of Little Woody, lost a considerable number of sheep last spring from anæmia, caused by the inferiority of the food supplies.

Horses entered for duty here during the year have been of a little better class than formerly.

I would respectfully submit that the lowest duty on horses entered at the customs be $12 a head. This would entail a much better class of horses being brought in.

I inspected during the year 1,574 head of horses for the customs. The inspection fees amounted to $538.25.

One black Clydesdale stallion belonging to Mr. Hovermale, which he was taking over to Montana, was also inspected.

I have the honour to be, sir,
Your obedient servant,
F. PERRY, V.S.,
*S. Sergt.*

To the Officer Commanding,
Regina District, N.W.M. Police.

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NORTH PORTAL, October 31, 1903.

SIR,—I have the honour to submit my annual report of work performed at this place for the Department of Agriculture during the year ending October 31, 1903.

The following number of stock have been inspected:—

| | |
|---|---|
| Horses | 13,244 |
| Cattle | 47,284 |
| Mules | 419 |
| Sheep | 139 |
| Hogs | 559 |

The inspection fees collected for the year amount to the sum of $5,919.45.

The great increase, both in the number of settlers' and dutiable stock, manifests very clearly the rapid development of the North-west Territories, and all indications point to a relatively still larger increase during the coming year; provisions for the accommodation and facilities for inspection should be provided for accordingly.

It is satisfactory to report that the stock imported by the immigrants from the various states is of very good quality, more especially the horses, each settler I presume only bringing the best of his stock; this may account also for the comparatively few head of animals rejected from entering. These were rejected for the following causes: Four cases of glanders, two of actinomycosis and two of mange in horses.

During the great influx in March and April the settlers' stock suffered a great deal owing to the long delays, rough treatment on the railways, and scarcity of water, especially here, where settlers were fortunate to secure water at 50 cents per barrel.

There has been a large importation of Mexican and Texas cattle, of very good quality, with the exception of a few train loads; showing a strong strain of Hereford breeding. The Mexican horses were comparatively of a poorer stock. Owing to lack of accommodation most of the southern cattle arriving in train loads were inspected at Velva, North Dakota, where large commodious yards were built last year. There are no facilities here for feeding and inspecting large numbers of cattle. Practically all the settlers' stock are inspected in the cars, which are invariably crammed to excess. This renders inspection very tedious and imperfect.

The condition of stock in this vicinity is good, no contagious disease having been reported to me.

I have the honour to be, sir,
Your obedient servant,
S. C. RICHARDS, S.S., D.V.S.

The Officer Commanding,
Regina District, N.W.M. Police.

MAPLE CREEK, October 31, 1903.

SIR,—I have the honour to submit this the annual quarantine report for Maple Creek district for the year ended October 31, last.

This district the past year has been unusually free from contagious disease in stock of all kinds. mange being practically the only disease existing, and this to a comparatively slight extent.

During the months of March, April and May last I travelled over the greater part of the district inspecting the stock wherever practicable, and gathering all information I could in regard to condition of stock generally, and made special reports of every trip at the time.

Mange, I believe to be becoming less prevalent in this district each year, due in a great measure to the fact that the stockmen recognize more fully the seriousness of the disease, and therefore keep close watch on their herds and begin treatment on first appearance of the trouble in nearly all cases.

Last winter was longer and more severe than in recent years in this district, and cattle came through it in rather poor condition, as a result of scarcity of feed.

A number of ranchers were compelled to turn their stock out before spring opened up in consequence of having run out of hay. Where this was necessary the stock fared worse than those which had not been kept up and fed at all.

Following the rather hard winter, there was a very bad storm of snow and cold rain in the latter part of May, which caused heavy losses in stock in all parts of the district. More especially was this the case with female stock. heifers and cows with calf succumbing in large numbers.

The past summer has also been unfavourable for stock, being cold and wet; consequently, stock are not in nearly as good condition this fall as in the past few years. This is obvious by a glance at the number of beef cattle shipped this season compared with former seasons.

Again, the demand for beef this fall is slight, and prices low; so taking everything into consideration, conditions are not altogether favourable to the rancher this year.

Horses and sheep came through last winter in good shape, but there was considerable loss in these as well as cattle in the May storm.

The demand for horses this season has been brisk and prices good.

Imports are considerably in excess of previous years in horses and cattle, and are of rather better quality generally.

Imports of sheep about the same as last year in number and of good quality.

I have been very careful in my inspections of stock imported and in no case have I found signs of contagious disease.

Following is list of stock inspected during year, comprising imports, exports and local shipments. Also statement of amount of veterinary inspection fees collected.

| | |
|---|---|
| Imports, Maple Creek, year ended October 31, 1903:— | |
| Horses | 3,370 |
| Cattle | 3,129 |
| Sheep | 8,269 |
| Mules | 21 |
| Exports— | |
| Cattle | 2,959 |
| Local markets— | |
| Cattle | 1,273 |

Veterinary inspection fees collected, $1,766.68.

I have the honour to be, sir,
Your obedient servant,
D. CORISTINE, V.S.

To the Officer Commanding.
N.W.M. Police. Maple Creek.

COUTTS, October 31, 1903.

SIR,—I have the honour to submit herewith my report of work done for the Department of Agriculture for the year ended October 31, 1903.

I took over the duties from Staff-Sergt. Carter on May 1, having been transferred from Depot division, Regina. My report prior to the above date has been compiled from the records kept on this detachment.

The total number of stock inspected coming into Canada through the ports of Coutts and Pendant d'Oreille (the latter port being opened on July 31), both by settlers under free entry and importers, are as follows:—

| | |
|---|---|
| Horses | 8,158 |
| Cattle | 6,971 |
| Swine | 174 |
| Mules | 46 |
| Sheep | 7,919 |

Inspection fees collected, $3,177.24.

Total exports—cattle—839.

I have the honour to be, sir,
Your obedient servant,
H. J. JOHNSTON, V.S.,
*Vet. S. Sgt.*

The Officer Commanding,
N.W.M. Police, Macleod.

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CARDSTON, ALTA., October 31, 1903.

SIR,—I have the honour to forward the annual report of work performed by me for the Department of Agriculture for the year ending October 31, 1903.

There were inspected for importation at this place 6,089 cattle and 3,578 horses. No animals were inspected for export.

I have the honour to be, sir,
Your obedient servant,
E. C. OLIVER, V.S.,
*Vet. S. Sgt.*

The Officer Commanding,
N.W.M. Police, Macleod.

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'E' DIVISION, CALGARY, October 31, 1903.

SIR,—I have the honour to submit this my annual report of work done for the Department of Agriculture for the year ending October 31, 1903.

I regret to say that glanders has been on the increase in this district. This is work which is surrounded with a host of difficulties, especially where no compensation for animals destroyed exists the poorer settlers do not inform, and some of those who are better off also suffer from this short-sighted policy, and we are hampered in ascertaining the whereabouts and the origin of the disease.

Staff-Sergt. Sweetapple has been engaged in the Red Deer district for the past year, and informs me he has just about got the disease stamped out there.

Dr. Nagel, of Red Deer, has also assisted us a great deal in giving us information as to where diseased animals were.

In March Dr. Riddell discovered glanders in the Eau Claire Lumber Company here, and since then we have destroyed some 13 horses, and 7 more are under quarantine waiting a further mallein test. Some cases are also awaiting further testing in the Crossfield district.

Mange exists in the Okotoks and High River districts, but not to the extent of previous years. Wherever it has existed the animals have been treated. Mange amongst horses is on the increase, and several ranchers' herds are now in quarantine in this district:—

These animals have all been treated, and are progressing favourably.

A number of horses have died between here and Edmonton from what the settlers call 'Swamp Fever,' but I am of the opinion that it is from 'Typhoid Influenza.' I am pleased to say not nearly so many as last year.

The fees paid practitioners while performing the duties of veterinary inspectors are, I think, altogether too small for the services rendered, and it is oftentimes very hard to get the men we require to act in this capacity.

In May this year several thousand Mexican cattle arrived in this district. These animals I have seen several times this summer on the range, and I am pleased to report that they are in a healthy condition.

Attached lists of horses killed for glanders and stock inspected during year*

*Not printed.

I have the honour to be, sir,
Your obedient servant.
ARTHUR HOBBS, V.S.,
*Vet. Staff-Sergt.*

The Officer Commanding,
N. W. M. Police, Calgary.

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CALGARY, October 31, 1903.

SIR,—I have the honour to report that during the past twelve months I have inspected for shipment 646 horses and 4,524 cattle, and found them all in healthy condition, free from any contagious or infectious disease.

I have the honour to be, sir,
Your obedient servant,
R. RIDDELL, *V.S.*

To the Officer Commanding
"E" Division, N.W.M.P., Calgary.

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FORT SASKATCHEWAN, October 31, 1903.....

SIR,—I have the honour to request that you will forward to the Commissioner's office, Regina, the attached annual quarantine report of services performed for the Department of Agriculture for the year ending October 31, 1903.*

I have the honour to be, sir,
Your obedient servant,
C. H. H. SWEETAPPLE, V.S.,
*Vet. Staff-Sergt.*

To the Officer Commanding
N.W.M. Police, Fort Saskatchewan.

* Not printed.

PRINCE ALBERT, October 31, 1903.

SIR,—I have the honour to forward the annual report of the work performed by me for the Department of Agriculture for the twelve months ending October 31, 1903, which is in detail on the accompanying form:—*

One hundred and sixty-two head of mangy horses were shipped into this district from Lethbridge, and I quarantined them shortly after their arrival, and they are all doing well under treatment, and forty-three head have been treated successfully and released.

Twenty-one head of horses were destroyed for glanders, and ten head yielded to the Mallein test, and are in quarantine. Four of the above horses have since been destroyed for glanders.

With the above exception the general health and condition of the stock in this district for the past year has been good.

I have the honour to be, sir,  
Your obedient servant,  
J. J. MOUNTFORD, V.S.,  
*Vet. Staff-Sergt.*

The Officer Commanding  
"F" Division,  
Prince Albert.

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## No. 47.

(J. C. HARGRAVE, D.V.S.)

MEDICINE HAT, October 31, 1903.

SIR,—I have the honour to submit the following report for the twelve months ending October 31, 1903.

Number of cattle inspected and passed for shipment was 3,013 head, and the number of horses inspected and passed for shipment, 711 head. A statement of these inspections is appended.

Seven (7) head were rejected for mange and two (2) for actinomycosis.

Beef cattle were not finished as good as those shipped last year.

The number and classes of animals imported from the United States at this port of entry are here given: Horses, 3,430; mules, 6; cattle, 73. 172 head of the total were inspected free, and fees to the amount of nine hundred and seventy-five dollars and fifty cents ($975.50) collected on the balance.

During the past twelve months 1,290 doses of black-leg vaccine (cord form) have been supplied, the sales amounting to one hundred and twenty nine dollars and twenty cents. The demand for this preventive was not so large as last year, although owners testify to the great efficiency of the vaccine in reducing losses from black-leg to a minimum. Only one report of black-leg this summer, and the owner vaccinated with good results.

*Glanders.*—During the year ten (10) horses were shot, as against 21 horses in 1902, and 43 horses in 1901, showing that glanders is not so prevalent. Number of horses in quarantine at this date, one, it having reacted to mallein. A buckskin horse in quarantine for 15 months received six injections of mallein during that time and was then killed, having continued to react. On post-mortem, glander tubercles were found in the lungs and the glands within and without the thorax.

*Mange.*—During February and March mange among cattle was prevalent, some ranchers having their herds infected to the extent of ten per cent. It disappeared as soon as spring opened up, and no indications of it were seen during the summer, but as soon as the cold weather commenced a few cases developed, but only one case was seen at the shipping yards. In April I discovered psoroptic mange in the range horses on the north side of the Saskatchewan river, since when energetic steps have been taken to stamp out the disease, but with what results cannot be ascertained until the spring round-up.

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* Not printed.

At the spring round up of horses, out of about 3,000 head gathered some 75 head were affected. These were held separate until cured. The ranchers state that they also gathered a number during the summer that developed the disease after the round-up. The fall round-up is working now, and when finished the herd will be inspected. The riders state that very little is showing now.

The most gratifying results in the treatment of mange were obtained from the perchloride of mercury; and lime and sulphur also gave good results

*Texas Fever.*—In June and July two bands of Mexican cattle were quarantined and inspected for the Texas fever tick. These cattle came from Mexico, and it was reported that several of these ticks were found on these cattle. They were inspected, both in the yards where unloaded and out on the range. Quite a number were thrown and examined, but no evidence of the tick was found. On the other hand, every animal thrown was found to be infected with the spinous ear tick, called Ornithodoros Megnini. The stock yards at Stair through which these cattle passed were disinfected.

*Tape Worm in Sheep.*—The loss of sheep from this cause during the past winter was very large, almost every rancher suffering large losses, this loss being principally among the lambs and ewes, although a few wethers were also lost. The winter was well on before the ranchers reported this loss and asked for an investigation, and the sheep were so badly affected that very little could be done. The number of worms found in an individual sheep varied; as many as 150 were found, and were from 2 inches to 2 yards in length. In treating them several drugs were tried, and those that were not already weakened too much seemed to derive some benefit from some of them. Turpentine proved to be dangerous in the hands of the shepherds, as they would administer it too rapidly, and quite often the sheep died in their hands. Areca nut, sulphate of iron and salt, was used by some, and they reported that at once the sheep seemed to improve. Kamala was also tried along with their salt, but it was noticed that they did not take much of it, and to what extent these remedies will help cannot be determined until this winter when the sheep come into their winter quarters, when these drugs will be used more extensively. The green grass when once it started seemed to help them, and no more were lost.

*Poisoning.*—During May a number of sheep were poisoned by eating the young Death Camas plants, one rancher losing about 150, out of a herd of about 2,000 in one night. Powders of potassi permanganate and alum were given in a drink as an antidote, and when used in time saved nearly every case.

No *ophthalmia* among cattle was seen or reported this summer, and not a case of *tuberculosis* came to my notice.

I have the honour to be, sir,
Your obedient servant,
J. C. HARGRAVE,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 48.

(A. G. Hopkins, B. Agr., M.D.V.)

Vancouver, B.C., October 31, 1902.

Sir,—Herewith I beg to present my report for the year ending October 31, 1902.

After returning from service as veterinary quarantine officer in Great Britain, I was stationed at Ottawa for some months assisting in the work of the veterinary branch. I was employed testing with tuberculin and mallein, assisting in the suppression of outbreaks of glanders, inspecting farms in Western Ontario quarantined for hog cholera; also inspecting the stock yards at Schreiber and North Bay, Ont., on which matters reports were made at the time.

In April last I was directed to proceed to Vancouver, B.C., for duty as inspector via the Crow's Nest Pass route, and to report on the conditions governing the carrying out of inspections and quarantine at the various ports along the boundary line.

I was recommended to call on the various customs officers en route as well as the officials of the branch engaged in work in the part of the country traversed. These instructions were followed and a report made to the Chief Veterinary Inspector. I arrived here the latter end of May and assumed charge of the duties formerly performed by Dr. J. B. Hart and Mr. Bland, V.S.

A change made by authority of your department since I assumed charge here, is the cessation of inspections on Canadian live stock for Dawson, Y.T., on which fees had been collected heretofore.

An outbreak of hog cholera in the Metchosin district, Vancouver Island, was reported to me by the Chief Veterinary Inspector, who instructed me to proceed to Victoria and co-operate with Dr. Richards in stamping out the disease, which was done, and reported upon. Later in the summer I was ordered to procced to the boundary country to investigate an outbreak of glanders reported by Dr. J. A. Armstrong, which fortunately proved to be less serious than reported.

In addition to doing inspection work at Vancouver, I have also to make inspections at the following ports, viz.: Sumas (Huntingdon), Abbotsford, and Douglas (Blaine), and also at New Westminster. Having had my attention drawn by the Chief Veterinary Inspector to an outbreak of scab in imported sheep, occurring at Sunbury, I beg to call attention to the laxity and practical inoperativeness of the customs regulations governing the entry of feeding sheep and those for immediate slaughter. As will be seen from the correspondence with the department and the certificates submitted, sheep have been admitted on certificates issued by persons other than those authorized to be accepted by this branch. I am of the opinion that the only feasible method to attempt to keep out such disease is to insist on inspection of all sheep imported from the States to the south, and do away with a regulation requiring slaughter within ten days and no change of ownership, a regulation that has been constantly and repeatedly broken.

The facility for inspection or quarantine at the ports under my charge are not at all satisfactory. I would also again draw attention to the Canadian Pacific Railway stock yards here, which are in need of improvement.

My attention was called to suspected cases of glanders by Dr. Hart. I was enabled to confirm his diagnosis, had the clinically affected horses (2) destroyed, and have under observation and control the remaining horses owned by the firm. I have also made subsequent tests with mallein, as is now required by the Chief Veterinary Inspector.

In the matter of red water, I have as yet had no opportunity of studying a genuine case, and so far have only been able to gather information regarding this disease from farmers. Mr. Sharpe, of the Experimental Farm, Agassiz, has kindly placed at my disposal all the information he had regarding the disease.

The prevailing opinion here is that the form of the disease seen in British Columbia is due to the cattle eating the fern or bracken (*pteris aquilina, var. lanugiosa*). The opinion has been advanced (*vide* report Dr. J. B. Hart, D. of A., 1902, p. 128) that the disease is due to a malarial agent. All persons furnishing me with information on this subject are a unit in saying that the disease is not found on the low lands, where fern is not present, but is prevalent on what are termed fern ridges. Farms adjacent will show marked difference in the freedom from or affection with the disease of the cattle carried on those farms.

I would suggest in regard to this disease (red water) that two or more healthy cattle preferably cows, in milk, be secured, and that arrangements be made to feed with a view to determining the effect fern has on the constitution and organs of cattle, and that a test may be made of the fat content of the milk by means of the Babcock test. By so doing data might be got which would either fix or exonerate from blame fern as the cause of the disease, and at a moderate cost, and might thus save an investigation more or less costly and incomplete without the facilities, only to be had in a first-class biological laboratory.

Reports of the number of animals inspected, together with the fees collected have been forwarded to your department from time to time.

I have endeavoured to cultivate an acquaintance with the live stock breeders of the province with a view to mutual assistance.

I desire also to mention the cordial assistance afforded me in the carrying out of my duties by the Collector and the Surveyor of Customs at Vancouver, the Collector of Customs at New Westminster and the sub-collectors of Customs at Douglas, Huntingdon and Midway.

I have been fortunate in securing the co-operation of the officials of the provincial department of agriculture when needed, and desire here to testify to the promptness with which Dr. Hart has attended to the duties assigned to him.

I have the honour to be, sir,
Your obedient servant,
A. G. HOPKINS.
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 49.

(C. R. Richards, M.D.C., V.S.)

Victoria, B.C., October 31, 1903.

Sir,—I beg to submit herewith my report of the inspections of live stock made by me at this port for the twelve months ending October 31, 1903.

There has been a total importation of 90 horses, 4 mules, 54 cattle and 335 sheep.

During the same time there have been exported to the United States 17 horses and 2 mules.

The horses were chiefly for light delivery and general purpose work.

The cattle consisted of 11 head of pure-bred Jerseys, imported for breeding from Oregon and Washington, and the remainder a mixed lot intended for dairying. They were all subjected to the test, and passed the same successfully, with the exception of one, a pure-bred Jersey. This one reacted to the test, and was afterwards destroyed with the consent of the importer.

The sheep were all imported from San Juan Island, and entered at Sidney, a sub-port of Victoria.

I have the honour to be, sir,
Your obedient servant,
C. R. RICHARDS, V.S.,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 50.

(J. A. Armstrong, V.S.)

Nelson, B.C., October 31, 1903.

Sir,—I have the honour to submit to you this, my report, for the year ending October 31, 1903.

During the year there was an outbreak of hog cholera at Greenwood, B.C., in which 93 animals were involved. There was also an outbreak of glanders on Rock and Anarchist mountain, in which five horses were slaughtered.

Following is a statement of stock imported into this district during the year:—

| —— | Horses. | Cattle. | Sheep. | Swine. |
|---|---|---|---|---|
| November, 1902 | | | | |
| December 〃 | 59 | | | |
| January, 1903 | | | | 3 |
| February 〃 | 100 | | | |
| March 〃 | 5 | 2 | | 5 |
| April 〃 | 44 | | 280 | |
| May 〃 | 79 | 22 | 872 | |
| June 〃 | 223 | | 719 | |
| July 〃 | 230 | 30 | 729 | |
| August 〃 | 182 | 1 | 1,590 | |
| September 〃 | 59 | 38 | 466 | |
| October 〃 | 34 | 8 | | 2 |
| Total | 925 | 101 | 4,656 | 10 |

I have the honour to be, sir,
Your obedient servant,
J. A. ARMSTRONG,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 51.

(W. S. Bell, V.S.)

Cranbrook, B.C., October 31, 1903.

Sir,—I have the honour to submit my annual report for year ending October 31, 1903, at ports Gatway, Cranbrook and Rykerts.

I am pleased to state that the stock passed at these ports was all in healthy condition and from northern Montana, Idaho and Washington; mostly belonging to settlers, and of a very fair quality.

I am also pleased to report that no outbreak of any contagious disease has shown itself.

The following are the animals imported during the year:—

| | |
|---|---|
| Horses | 1,041 |
| Cattle | 43 |
| Mules | 1 |
| Pigs | 1 |

I have the honour to be, sir,
Your obedient servant,
W. S. BELL, V.S.,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

## No. 52.

## REPORT ON LIVE STOCK CARS AND YARDS WEST OF WINNIPEG.

(Chas. W. Peterson, Inspector.)

Calgary, N.W.T., October 31, 1903.

Sir,—I have the honour herewith to submit my report for the year ending October 31, 1903.

### YARD INSPECTION.

I am pleased to be in a position to state that there has been a marked improvement in the condition of shipping and feeding yards all over my division, which includes all that portion of the Dominion lying west of Winnipeg. During the somewhat dry years which preceded the date of my appointment the condition of stock yards was a subject that was not brought very prominently before the public or transportation companies, but with the abnormal rainfall and the enormous increase in the volume of live stock shipments, the accommodation and state of cleanliness of these yards have become matters of very considerable importance, and it is only fair to state that the railway companies have displayed very considerable energy in improving these yards, and have invariably acted promptly on complaints made by me from time to time in the course of my inspection work.

The following statement shows the railway stock yard facilities available within my division:—

| — | No. of Yards. | Total car load capacity. | Average carload capacity. |
|---|---|---|---|
| Manitoba | 73 | 286 | 3·95 |
| North-west Territories | 70 | 754 | 10·77 |
| British Columbia | 20 | 157 | 7·85 |
| Total 1903 | 163 | 1,197 | .... |

During the year I have inspected all stock yards in the province of British Columbia and in the North-west Territories, including those along all branch lines of railway, and I have also inspected the more important yards in the province of Manitoba. All feeding and resting yards, as well as the more important shipping yards in my division, have been visited twice or oftener.

As stated in last year's report, the transportation companies have shown every anxiety to comply with the provisions of the law respecting the cleaning, &c., of stock yards, and cases that have come to my notice during the year of defective arrangements have generally been due to negligence on the part of employees charged with the duty of attending to these yards.

The usual number of complaints have been made respecting the condition of resting yards west of Winnipeg, which, as a rule, have not been well founded. Some shippers are only too ready to look for any excuse to avoid the expense of resting their stock en route, and frequently lodge claims with the railway authorities for losses occasioned by such action on the grounds that the yards were not in fit condition to accommodate the stock. When more humane methods prevail in connection with the treatment of stock in transit these complaints will not arise so frequently.

The Canadian Pacific Railway stock yards at Winnipeg have recently been removed and remodelled, and are now situated near the abattoirs at the west end of Logan avenue. Those set apart for cattle alone cover an area which is 1,035 feet in length by 255 feet in width, or a distance from east to west of one-fifth of a mile. This space is exclusive of a building specially erected for sheep and hogs, the dimensions of which are 37 by 250 feet. Some idea of the extent of this accommodation may be had when it is stated that the provision for cattle alone will enable a shipment of 150 cars to be placed within the comfortable pens at one time. By an admirable management of loading and unloading chutes, this part of the work can be carried on throughout the entire length of the system, the cars being loaded and unloaded without interruption.

The whole of this yard has been floored with three-inch tamarack and British Columbia fir, the cost of the flooring alone being in the neighbourhood of $12,000. The questions of water supply and drainage have been carefully considered, and the yards will have the company's own supply extended as soon as the necessary work can be completed. The latter will be used exclusively, except during an emergency, when that of the city will be available.

An important departure has been inaugurated by the Canadian Pacific Railway this year, in turning over their feeding and resting yards to private corporations. The Winnipeg yards will soon be in charge of a stock yards' company, and it is understood that the yards at Calgary and Moosejaw will before long be under a similar form of management. There can be no doubt that this idea will have a distinct tendency towards improving the facilities for handling stock at these important yards, as companies depending entirely upon the good will of the public for their revenue and organized for the specific purpose of managing such yards, will naturally be able to devote more attention to details than a railway company could possibly do.

### INSPECTION OF CARS.

Very few cases were brought to my notice where dirty cars were furnished shippers. The offending parties were properly reprimanded whenever complaints were lodged with the railway authorities. There can be no doubt that the action of the department in bringing all cases of complaints to the attention of the proper railway officials has had a splendid effect.

Some cases arose during the year where cars containing old litter were sent across the boundary line at Gateway, B.C., by the Great Northern Railway Company. It is unlikely that any repetitions of this offence will occur.

### OFFICE WORK.

During the year the office was removed from Regina to Calgary. The latter point being more nearly in the centre of the division and located in the ranching portion of the Territories, I have been able to perform my duties more conveniently than hitherto.

A considerable number of circulars and letters have been sent during the year, and I have made it a point to keep in close touch with the brand inspectors throughout the Territories, whose valuable assistance and co-operation I have much pleasure in acknowledging.

I have the honour to be, sir,
Your obedient servant,
CHAS. W. PETERSON,
*Inspector.*

The Honourable
The Minister of Agriculture,
Ottawa.

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## No. 53.

## REPORT ON 'SWAMP FEVER' IN HORSES.

(F. Torrance, D.V.S.)

Winnipeg, Man., October 31, 1903.

Sir,—I have the honour to submit my report upon the season's work in the investigation of 'swamp fever' of horses in Manitoba. The disease has, fortunately, not been as prevalent this year as last, but while this is most satisfactory from the horse-owners' standpoint, it has been disastrous for our investigation. It has made it impossible to obtain the cases necessary for the work, and consequently but little progress has been made.

During the early part of the year, a few cases were obtained, but these were ones that had carried over the disease in a chronic form from the previous season, and did not furnish suitable material for observation. One of these was a mare which we had under experimental treatment during the previous summer with apparent success, and had turned over for the winter to a dairyman who agreed to feed her for her work. This she did satisfactorily for a time, and put on flesh, but later began to fail, developed a partial paralysis of the hind quarters, and finally died, illustrating the tendency of the disease to relapse. Some other cases were shipped to us shortly after this through the kindness of Dr. Hilton, of Portage la Prairie, but were so far advanced in the disease that one of them died before it could be removed from the stock yards, and the others lived only a few days. In every case, a careful post-mortem was made and cultures of various organs obtained for bacteriological research by Dr. Bell.

During the months of June, July, August and September, when the disease is usually prevalent, no cases could be obtained, and veterinary surgeons in various parts of the province reported that very little had been seen of the disease during the summer.

The ebb of the disease in Manitoba, which has had a dry summer, appears to coincide with a flow or increase in the North-west Territories, where the season has been unusually wet, a fact which lends support to the theory of swamp infection as the main source of the disease. With the return of wet seasons in Manitoba the disease is likely to resume something of its previous virulence, though the cultivation of the land, drainage of marshes and the use of cultivated grasses for hay should eventually reduce its ravages to a great extent. Farmers who have suffered losses from 'swamp fever' in other seasons have been advised through the agricultural papers to avoid pasturing their horses and to water them only from wells. This advice has had a good effect in diminishing the number of cases and reducing the loss.

The recently published report of the Minnesota State Board of Health contains an account of the work of Drs. Brimhall and Wesbrooke, in investigating a disease similar to 'swamp fever,' that exists in some limited areas of the State. These investigators have isolated from the blood and tissues of diseased horses, a bacillus which they have named *bacillus equisepticus,* and consider it the cause of the disease. The experiments to test this point by inoculating healthy horses with pure cultures of this bacillus do not seem conclusive, as the disease produced resembled septicæmia rather than 'swamp fever,' and there was no diminution in the number of the red blood corpuscles. Further research is necessary to determine the relation of this bacillus to the disease and also to ascertain whether the disease Drs. Brimhall and Wesbrooke have been investigating is identical with swamp fever of Manitoba or not. Work upon these points will be done as soon as suitable cases can be procured.

Recently some fresh cases have been observed, but as the owners have been unwilling to sell any of them at a reasonable figure, I have been unable to obtain any of our research. When the owners' consent can be obtained, however, the blood is examined for trypanosomata and bacteria, Dr. Bell assisting in the work. Three of these cases occurred in the outfit of a railway contractor who has just returned from work upon the Yorkton extension. He reports having lost eleven horses out of twenty-eight, and has these three still affected. The district in which he was working is low and wet, and the horses were watered in the sloughs.

No further information is available at present, and while regretting that, owing to causes beyond my control, the results are meagre and incomplete. I venture to hope that next year may give much better returns and clear up the pathogenesis of the disease.

I have the honour to be, sir,
Your obedient servant,
F. TORRANCE, B.A.,
*D.V.S*

The Honourable
The Minister of Agriculture.
Ottawa.

# BOVINE AND HUMAN TUBERCULOSIS.

By D. E. Salmon, D.V.M., Chief of the Bureau of Animal Industry, Washington, D.C.

*Presented at the Meeting of the American Veterinary Medical Association, Ottawa, Canada, September, 1903.*

The prevention of tuberculosis in the human subject has been for years and still is one of the most interesting and important questions confronting the sanitarian. There have been many differences of opinion; many cases in which the same facts have been interpreted in different ways; and much discussion and divergence of views as to what actually are the facts.

After the publication of the results of the investigations of Villemin, Chauveau and Gerlach in 1866, '68 and '69, which demonstrated the communicability of tuberculosis, veterinarians looked upon bovine tuberculosis as a communicable disease, and were inclined to consider it as identical with human tuberculosis. Their clinical experience, in stables where the disease clearly was introduced by a purchased animal and spread from beast to beast until the greater part of the herd was affected, confirmed the conclusions of these investigators, and it appeared to them further that there was often a remarkable coincidence between the use of milk from tuberculous cows and the development of the disease in mankind.

These views, however, did not gain much standing in the medical profession. The opinion of the great majority of physicians that tuberculosis was an hereditary disease was too deeply rooted to be dislodged except by the most overwhelming array of facts inconsistent with it. Koch's discovery of the tubercle bacillus in 1882, taken in connection with the experiments showing the transmissibility of the disease, brought a complete revolution of the medical mind with reference to its causation and prevention, and seemed to establish the essential identity of the tuberculosis of various species of animals with each other and with that of the human race.

New doubts arose, however, when in 1889 and 1890 Rivolta and Maffucci showed that there were very marked differences between human and avian tuberculosis. Theobald Smith's papers published in 1896 and 1898 demonstrating marked differences between a bacillus from the nasua and one of bovine origin, and between bacilli from human and bovine sources, recalled similar observations which had been made by Villemin, Pütz, and Sidney Martin, and aroused renewed interest in the study of varieties of this bacillus and the significance which might be attached to them. In 1897 and 1898 Dubard published papers on tuberculosis in cold-blooded animals, showing that the bacillus in this disease had varied in an extraordinary degree from the human type.

Notwithstanding the extreme divergence in biological characters between the avian, the piscine and the mammalian types of bacilli, investigators concluded that they were essentially the same, and that the avian might be changed into the mammalian and the mammalian into the piscine types by suitable modification of the environment. If, therefore, the avian bacillus could be made to produce tuberculosis in mammals, and the mammalian bacillus to produce this disease in fishes and frogs, there appeared no reason to doubt that the bovine bacillus could produce tuberculosis in man, since the human and bovine bacilli resemble each other much more closely than do the avian and mammalian or the mammalian and piscine forms.

This, briefly, was the condition of our knowledge of the question when in 1901 Koch read his memorable paper before the British Congress on tuberculosis. In that paper he said: 'I feel justified in maintaining that human tuberculosis differs from bovine, and cannot be transmitted to cattle.' Concerning the transmission of bovine tuberculosis to man, he admitted that it was impossible to give this question a direct answer, because the experimental investigation of it with human beings was out of the question. He said, however: 'It is well known that the milk and butter consumed in great cities very often contain large quantities of the bacilli of bovine tuberculosis in a living condition,' and if these bacilli 'were able to infect human beings, many cases of tuberculosis caused by the consumption of alimenta containing tubercle bacilli could not but occur among the inhabitants of great cities, especially the children.' He concluded that 'in reality, however, it is not so.' The only facts which he cited in support of this remarkable conclusion were some selected post-mortem statistics which indicated that primary tuberculosis of the intestine was an extremely rare disease. He expressed an important assumption as follows: 'That a case of tuberculosis has been caused by alimenta can be assumed with certainty only when the intestine suffers first.' But he did not admit that all such cases are caused by bacilli ingested with the food. 'It is just as likely,' he said, 'that they were caused by the widely propagated bacilli of human tuberculosis, which may have got into the digestive canal in some way or other—for instance, by swallowing saliva of the mouth.' He said we may determine from which source the infection occurred by inoculating cattle with a pure culture of the bacilli found in the tubercular material, and for this purpose he recommended subcutaneous injection, which he said 'yields quite specially characteristic and convincing results.'

He reported that he had experimented upon nineteen head of cattle by infecting them in various ways with pure cultures of tubercle bacilli taken from cases of human tuberculosis or with sputum from consumptive patients. In some cases the tubercle bacilli or the sputum were injected under the skin, in others into the peritoneal cavity, in others into the jugular vein. Six animals were fed with tubercular sputum almost daily for seven or eight months; four repeatedly inhaled great quantities of the bacilli, distributed in water and scattered in the form of spray. None of these cattle showed any symptoms of the disease, and no trace of tuberculosis was found in their internal organs. The animals were absolutely insusceptible to these bacilli. An almost equally striking distinction between human and bovine tuberculosis was brought to light by feeding swine with tubercular sputum and by injecting tubercle bacilli into the vascular systems of asses, sheep and goats. In all these experiments bovine material was used upon similar animals for comparison.

These experiments would be quite convicting as to the harmlessness of tubercle bacilli from man for these various animals, were it not for the fact that it has been shown there are great variations of virulence in tubercle bacilli from different human subjects. Vagedes, working under Koch's direction, had shown this three years before the paper was read at London, and yet Koch gives no hint of this, nor does he admit the least suspicion that there might be different results with different infective material.

Perhaps the most astonishing statement made by Koch in his London paper is found in the following sentence: 'If one studies the older literature of the subject, and collates the reports of the numerous experiments that were made in former times by Chauveau, Guenther and Harms, Bollinger and others, who fed calves, swine and goats with tubercular material, one finds that the animals that were fed with the milk and pieces of the lungs of tubercular cattle always fell ill of tuberculosis, whereas those that received human material with their food did not.'

Now, the fact is, Chauveau, in a remarkable series of experiments, did infect cattle with human tubercular material, and obtained just as serious results as with bovine material. His conclusion was that the human tubercular virus acts on the bovine species exactly like the tubercular virus which comes from the bovine species itself. Bollinger inoculated a young calf in the peritoneal cavity with material from a human lung. When killed at the end of seven months the mesentery and peritoneal covering of the spleen presented a number of tumours from the size of a pea to that of a walnut, which microscopically were identical with those found in pearly disease under natural conditions. The retroperitoneal and mesenteric glands were tuberculous also. The paper of Guenther and Harms upon this subject I have not been able to consult, nor have I seen any satisfactory summary of it. At least two out of three of the older experimenters cited by Koch had therefore obtained positive results by inoculating cattle with human tubercular material.

Koch was equally inexact in his citations concerning his own previous declaration on this subject. He said : 'Even in my first circumstantial publication on the etiology of tuberculosis I expressed myself regarding the identity of human tuberculosis and bovine tuberculosis with reserve.' What he really said in that paper was this: 'Bovine tuberculosis is identical with human tuberculosis, and therefore a disease transmissible to man. * * * However great or small may be the danger which results from the consumption of meat or milk affected with bovine tuberculosis, it is present and must therefore be avoided.'

In the period which has elapsed since the London Congress, a period of less than two years, a considerable number of investigators have had positive results in the inoculation of cattle with tubercular material from the human subject and with pure cultures of tubercle bacilli from the same source. Among these may be cited Ravenel and de Schweinitz in this country, and Thomassen, de Jong, Delepine, Orth, Stenstrom, Fibiger and Jensen, Max Wolff, Nocard, Arloing, Behring, Hamilton and Young, and Dean and Todd. Some of these and other investigators have also produced the disease in sheep, goats and swine by infection in various ways with human tuberculosis. As the animals named were refractory in Koch's experiments, the success of various experimenters with them is quite significant.

In the Bureau of Animal Industry two distinct lines of experiments have been carried on, in order that one might be checked up against the other. De Schweinitz, in the Biochemic division, has isolated nine cultures from human tuberculosis. Two of these were derived from human sputum, three from cases of generalized tuberculosis in adults, and four from cases of generalized tuberculosis in children. These cultures were compared with a newly isolated virulent culture of bovine tuberculosis, and among them two of the cultures from children were found to be identical in their cultural and morphological characters with the bovine bacillus. They also killed rabbits and guinea pigs in as short a time as did the bovine bacillus. Hogs inoculated subcutaneously with these two cultures from children died of generalized tuberculosis. Two calves, weighing over 300 pounds each, developed a generalized tuberculosis after a subcutaneous inoculation with these virulent human cultures, and a yearling heifer inoculated with one of them showed generalized tuberculosis when killed three months after inoculation. Both the cattle and the hogs had been tested with tuberculin and found to be free from tuberculosis before the inoculations were made. It will be observed that 50 per cent of the cultures obtained from children were virulent for cattle.

Mohler, working in the Pathological division, has obtained three very virulent tubercle bacilli from the human subject. A goat inoculated subcutaneously with a culture of one of these died in 37 days with miliary tuberculosis of the lungs involving the axillary and prescapular glands. This bacillus was obtained from the mesenteric gland of a boy. Of still greater interest is a bacillus isolated by Mohler from human sputum. A goat inoculated subcutaneously with a culture of this germ died in 95 days of pulmonary tuberculosis. A cat inoculated in the same manner died in 23 days of generalized tuberculosis. A rabbit similarly inoculated died in 59 days of pulmonary tuberculosis. A rabbit inoculated with a bovine germ for comparison lived 10 days longer than the one inoculated with this sputum germ.

It is plain from these experiments that there is a great difference in the virulence of tubercle bacilli from human sources, and that while some of these are not capable of producing serious disease in cattle, sheep, goats and swine, there are others which produce generalized lesions and are very fatal with such animals.

Having disposed of the argument that human tuberculosis is not transmissible to animals, let us briefly consider the other proposition, viz., that bovine tuberculosis is not transmissible to man.

The proportion of cases in which the primary lesion is in the intestine is a very poor criterion from which to judge the proportion of cases caused by ingestion of the bacilli with the food. With experimental animals in which the disease has been produced by feeding tubercular material we very frequently fail to find any lesions in the intestines, and we find the oldest lesions in the mesenteric glands, the liver, spleen, kidneys, or perhaps in the lungs. Koch tells us that in his experimental swine fed with the tubercular sputum of consumptive patients no trace of tuberculosis was found, except here and there little nodules in the lymphatic glands of the neck, and in one case a few gray nodules in the lungs. With these results before his eyes how could he consistently claim that we must find primary lesions of the intestine in all cases of ingestion tuberculosis? With pigs particularly, but probably with all animals to a certain extent, the tubercle bacilli taken with the food may penetrate the walls of the pharynx, and advancing down the neck gain entrance to the lungs. The same method of infection has been repeatedly noted with children. Again, it has been shown by the experiments of Desoubry and Porcher and those of Nicholas and Descos that various kinds of bacteria, including tubercle bacilli, may penetrate the intestine, without causing any local lesion, and pass directly into the chyle vessels and from these into the blood whenever milk or fat constitutes a considerable proportion of the food.

These facts being admitted, it is absurd to hunt through the statistics for primary lesions of the intestine as an argument for or against infection with bovine tuberculosis. In the hospital statistics of Great Britain we find a considerable proportion of cases with children, 25 to 30 per cent, in which there are primary lesions of the intestine. In other countries such cases are quite rare. Heller has recently made 714 post-mortems of children who had died of diphtheria, and among these found 140 who had an associated affection of tuberculosis in various organs. Only 1·43 per cent showed primary intestinal tuberculosis, but in 37·8 per cent the primary lesion was in either the intestine, the mesenteric glands, or in other abdominal organs. It would appear, therefore, that even in Germany there is abundant evidence of ingestion tuberculosis.

This brings us to the question as to how we can tell whether a case of tuberculosis which is evidently caused by penetration of the bacilli through the walls of the pharynx or those of the intestine is due to bovine bacilli taken with the food or to human bacilli which have been swallowed with the saliva, &c. The test that Smith and Koch have laid down is that we should isolate the bacilli, and by the inoculation of cattle show that these bacilli have the virulence of the known bovine bacillus. This résumé of the condition of the experimental knowledge of the subject makes clear the importance of such experiments as have been made in the Bureau of Animal Industry to show the effect of bacilli from the human subject upon the principal domesticated animals. These experiments aid in filling a gap which it was necessary to bridge before we could fully and completely answer the arguments of those who believe it is unnecessary to consider the existence of bovine tuberculosis as a factor in the control of human tuberculosis.

You will observe that de Schweinitz has isolated tubercle bacilli from human lesions which when cultivated in the laboratory are of the bovine type, and that he has produced fatal disease in bovine animals by inoculating them subcutaneously with cultures of these bacilli. That is, he has fulfilled the most difficult requirements as to experimental work which those who oppose the theory of the transmission of bovine tuberculosis to man have been able to formulate. The results of these experiments make it necessary to admit either that human and bovine tuberculosis are identical, or that, being different, the bovine form is transmissible to man. There is no third theory by which the presence in human lesions of tubercle bacilli having the characteristics of the bovine type can be satisfactorily explained.

From the standpoint of experimental medicine, the evidence which has been brought forward should be sufficient to settle the question of the transmission of bovine tuberculosis to man. Koch plainly said in his London address that all that was necessary to decide with certainty whether the tuberculosis of the intestine was of human or of animal origin was to cultivate in pure culture the tubercle bacilli found in the tubercular material, and to inoculate cattle with them. In his latest address on this subject, which was made at the International Conference on Tuberculosis at Berlin, he practically abandoned the discussion from the experimental standpoint and devoted his time to a discussion of clinical evidence. As might be expected, he found none of the cases of supposed transmission of bovine tuberculosis to the human subject to be entirely free from the possibility of criticism. He seemed to forget that if demonstrations could be so easily made from clinical observations it would be unnecessary to devote so much time and expense to experimentation.

In the address mentioned he laid down a set of conditions which must be fulfilled to make clinical evidence convincing. Briefly, these are as follows:—

1. Certain proof of tubercle, and where possible the primary focus must be supplied. (To this condition the only objection is that the primary focus, which is made so much of, is of little value in determining the origin of the infection, for the reasons already given.)

2. Other sources of infection must be excluded with certainty. (This condition absolutely excludes all clinical evidence bearing upon the subject of tubercular infection. How is it possible to prove that any given individual has not been exposed to the bacilli of human tuberculosis ? He tells us that the main source of the infection of tuberculosis is the sputum of consumptive patients. We are all inclined to admit this; but suppose we try to get such clinical evidence in favour of this proposition as he asks for in regard to bovine infection, where are the cases recorded ? You say a certain person who has recently contracted consumption had habitually been in a room with another consumptive patient, and was infected by that patient. Very well; but how can you prove that that person never ate any tuberculous meat, never partook of any tuberculous milk, never ate any butter containing the tubercle bacillus, never had an opportunity to be indirectly infected from the hands of cooks or from table utensils which had been in contact with tuberculous meat, milk or butter, and was never exposed to the infection scattered in so many ways by tuberculous animals ? Can you exclude with certainty all these sources of infection ? Certainly not; the thing is impossible. Now what becomes of the evidence upon which Koch bases the assertion that the main source of the infection in man is the sputum of consumptive patients ? Surely he should be willing to try the clinical evidence bearing upon this point by the same requirements which he demands for the clinical evidence by which we endeavour to establish infection from bovine sources.)

3. In each case of alleged infection from milk affected with 'Perlsucht' the condition of the rest of the people who have taken the same milk should be borne in mind. These fellow consumers form to a certain extent a control experiment, and if of the numerous people who have drunk the suspected milk only a single one sickens, this weighs decidedly against the belief that this one person was infected by the common food. (Suppose we apply this principle to our clinical case of alleged sputum infection, what is the result ? Are there not scores of people exposed to many consumptives without contracting the disease ? Are not the most of us exposed scores of times to consumptives without having contracted the disease ? And yet, how er-

roneous it would be to exclude clinical evidence suggesting contagion because only one of those exposed to a certain consumptive had contracted the malady.)

4. The source of the milk should be attended to. Since in recent years it has become more and more evident that milk containing tubercle bacilli is yielded only by such cows as suffer from tuberculosis of the udders, the general statement that some one has drunk milk from a cow suffering from Perlsucht no longer suffices to prove to us that Perlsucht bacilli have really reached his digestive organs. It must be milk from a cow with tuberculosis of the udder, and therefore a statement on this subject should not be wanting in a report on milk infection if it is said to be complete. (This argument is antiquated, since it has been proved again and again that the milk of tuberculous cows often contains tubercle bacilli when no lesions of the udder can be discovered. Of the many experiments that have been made to determine the proportion of tuberculous cows which yield infectious milk, the average results are about 15 per cent, while the cases with tuberculosis of the udder are not over 2 or 3 per cent. It is not necessary to comment further on these requirements.)

Koch advances another line of argument which I have heard elsewhere, and which appears to me most misleading. He says: 'We cannot but expect that if tuberculous infection through partaking of meat and milk infected with Perlsucht really occurs as frequently as is asserted, direct observation must make this obvious.' He then recalls the so-called cases of meat poisoning, and cases of illness resulting from the use of the flesh of animals which had suffered from splenic fever, also to the distribution of typhoid infection through milk. 'It is,' he alleges, 'extraordinarily characteristic of all these animals that they do not occur as isolated illnesses, but in groups, and often in epidemics. This could scarcely be otherwise, for the milk of a cow, the flesh of a sick animal, is practically always partaken of by several, and often by a great many people at the same time, who will be infected and fall ill, certainly not as a whole, but on a larger or smaller percentage. * * * A tuberculous infection must also take shape in the same way if tubercle bacilli which are virulent for man are found in meat or milk.'

The fallacy of this argument lies in the difference in the illnesses referred to, and in the conditions of exposure. The opportunities for contracting the illness known as meat poisoning, or that of splenic fever, are extremely rare, and it may reasonably be assumed when a group of such cases occur at the same time and near together that they are of common origin. Moreover, the period of incubation in these diseases is very short, and the symptoms are striking and serious from the beginning of the illness. Attention is immediately attracted to them. It is the very opposite with tuberculosis. There are opportunities everywhere of contracting it; there may be a dozen cases in the same town, and yet if the individuals are not in the same family no one thinks of a common origin. Then the period of incubation is so long and the access of the disease is so mild that it does not attract attention until so long time has elapsed that the incidents which occurred at the time of infection have faded from the mind and can no more be recalled. Finally, the time which passes between infection and the appearance of marked symptoms of the disease varies so much with different individuals that if infection occurred at the same time with a number of persons the disease would not appear so simultaneously as to attract special attention, as it does in meat poisoning or in splenic fever infection. The comparison with the distribution of typhoid fever infection through milk is a better one, but the difficulty of tracing this infection in a community where the disease is common and the sources of the contagion numerous may, I think, be appreciated by all. But typhoid infection must as a rule be much more easily traced than tubercular infection, because the sources of the contagion are not so numerous nor widely distributed, the incubation is shorter, and the symptoms are more serious at the beginning. On the other hand, so much of the milk and butter sent to market is infected with tubercle bacilli, and we consume these food products from so many different sources, that practically every one must take bovine bacilli into his digestive organs, not once only but many times. Now, when the disease develops, even if we prove by the characteristics of the bacilli that it has been caused by germs of bovine origin, how can any one point with certainty to this milk or this butter, consumed weeks or months before, and say that it was the cause of the infection ?

Take, if you please, the average citizen who travels from place to place, passing his nights in sleeping cars under possibly infected blankets, or in hotel rooms of the history of which he knows nothing, who drinks at the fountains out of the common drinking cups, who must necessarily come into close contact with many consumptives, who inhales dried sputum on the streets. If he becomes infected, can you point with certainty to the source of his infection ? Certainly not; nor can you point out groups of patients who have been infected by one and the same consumptive person, although many individuals were exposed to that person. If this cannot be done in the case of infection from human sources, how can we expect it to be done with infection through meat, milk, and butter ?

We can only hope to get fairly satisfactory evidence as to the source of infection in the case of young children who have been in one house during their whole lives and who have not come into contact with any tuberculous persons. But in most cases, it would appear from the present condition of our knowledge that the virulence of the bacilli for cattle will be the best evidence of the source of the infection; that is, whether it comes from man or from the lower animals. The experimental proofs of tubercle bacilli in human lesions, having all the virulence of the bovine bacillus, are incontestable, and should cause sanitarians to take adequate precautions against infection through the products of diseased animals. The frequency of infection from animal sources can only be determined by long and careful investigation, but we do know how common the disease is with cows, how often the bacilli are found in the milk, and how frequently tuberculosis attacks children at the milk-drinking age.

Very recently (July, 1903) Kossel has given some of the results of the investigations of the German Tuberculosis Commission. This commission has studied and tested the virulence of 39 different fresh cultures of bacilli from human tuberculosis. Twenty-three of these cultures were from adults and 16 from children. Among the 16 cultures from children 4 were virulent for cattle. Two of these were cases of primary tuberculosis of the digestive organs, and two others were miliary tuberculosis. Kossel states that while these cultures were not as virulent as the most virulent cultures of the tuberculosis of animals, they were much more virulent than the weaker cultures of cattle tuberculosis. It is plain, therefore, that these cultures were of about the same virulence as the average bovine tuberculosis, and that this commission, working according to the principles laid down by Koch, has found 25 per cent of the cases of tuberculosis in children investigated by them to have been caused by infection with bovine tuberculosis. Whether this is a greater or smaller proportion than some have believed is of little consequence. The figures are definite, and to most of us it would be astounding if it should be found that they are of general application. The danger from bovine tuberculosis can no longer be doubted; and whether it is found that 25 per cent of the cases of tuberculosis in children, or a greater or smaller proportion, are due to infection from animal sources, it is plain that the proportion is sufficiently high to make the prevention of such infection a matter of the greatest importance.

# THE BANG SYSTEM FOR STAMPING OUT TUBERCULOSIS IN CATTLE.

By the Hon. W. C. Edwards.

Coming to the subject on which I am to occupy your time for a few moments, referring to the close alliance and association between human beings and domestic animals, and recalling the statement made by the great German scientist, Dr. Koch, about two years ago, the question of tuberculosis in our domestic animals would appear not to have the same significance as affecting human beings as was formerly generally supposed. The relation or similarity as between human and bovine tuberculosis and the communicability from one to the other is, however, one for scientific and professional men to thresh out. I will not presume to express my opinion on this complex question. I will be permitted, however, I am sure, to say that for myself I regard the safest course, while doubt still remains, is to allow the doubt to rest on the side of the greater security, and continue to assume that there is danger until it is uncontrovertibly proven that there is no danger of human beings contracting tuberculosis in various ways from domestic animals so diseased. But even if finally it is proven that the disease is not communicable from animal to man, there is no reason why the efforts being made for the eradication of the disease in our animals should be stayed for a moment. In our best interests, having regard to the animals only, it is most highly desirable that the disease should be eradicated. It is to be found to the greatest extent in our pure-bred herds, the source from whence sires are obtained for the general improvement of the herds the world over, and unless our pure-bred herds are cleansed of the disease the process of spreading it will go on until it pervades the entire live stock interests of each country where it is not eradicated, and the extent to which it will be injurious to the live stock of each country will be measured by surrounding conditions, and the loss of animals will be measured largely by the general sanitary or unsanitary and other conditions prevailing, so that regardless of the matter of the danger to human life, it is highly in the best interests of the stockman that his herds and flocks should be free from disease of every nature, and the question arises—can tuberculosis, one of the most constant diseases present in animals, be eradicated ? My answer is 'yes,' most emphatically. It can be done, and once eradicated, by reasonable care healthy herds and flocks in this respect can be maintained; and the system we recommend is the Bang system, which has been rigidly practised on our farm since the year 1898. In the spring of that year, intending to ship some young bulls to Wisconsin, we asked our Dominion veterinary authorities to test them, and to our surprise and regret it was found that all responded to the tuberculin test. This was our first knowledge of the existence of the disease in our herd. For a few days we were undecided what course to pursue, but on consultation with Hon. Sydney Fisher, Minister of Agriculture, who recommended testing the whole herd, and who further urged upon us the advisability of adopting the Bang system for the eradication of the disease, and on our consenting he at once placed us in communication with Dr. McEachran, then Chief Dominion Veterinary Inspector, who immediately had the entire herd tested, and gave us full information and instructions as to the Bang system. The greater part of the herd responded to the test, and a separation was at once made of the healthy from the diseased animals. The decision was to weed out and kill all but animals of desirable pedigree and individuality, and the slaughtering took place under veterinary inspection. Of the 50 to 60 animals slaughtered, only 3 proved unfit for human food, but in all traces of the disease in a more or less degree were found, but in most cases very trifling traces of it. The stables formerly occupied by the herd were most thoroughly disinfected for the reception of the healthy animals, and entirely new premises were erected for the diseased animals we retained in our herd, and in like manner the diseased animals have been kept in separate and distinct pastures from the healthy ones since that time, and have never mingled in any way.

### *Raising the Calves.*

In the inception of our experiments we sterilized the milk from the diseased cows as directed by Dr. McEachran, and fed the calves from the pail. This plan we found successful in so far as raising sound calves was concerned, but it is a somewhat troublesome one, and further, we lost a few calves as we believe from the fact that they were so fed at once without first taking the mothers' milk in the natural way. This plan, while successful, we have discarded entirely, and we have adopted the plan of raising the calves on nurse cows, allowing the calf always to suck the mother once before making the change. This plan we have found most successful in every particular, and in the practice of either of these plans described we can vouch for it from our experience that healthy calves can be most successfully raised from diseased dams or diseased sires and dams, and if all is carefully carried out the percentage of diseased calves raised will be very small indeed; so small that it need hardly be considered. In our experiments everything has been entirely satisfactory to us, and we strongly recommend the practice to our brother breeders, many of whom we are sorry to say have, up to this time, resisted the advice in this respect of our veterinary authorities both in the United States and Canada, and the subject has been a most controversial one. We can only say for our part that after a very considerable experience we are firm believers in the Bang system, and we are believers in the tuberculin test as the only present means, so far as we are aware, of ascertaining the existence of the disease. The only failure, so far as we have knowledge of, is in cases where the disease is in such an advanced stage that reaction does not take place. In a well conducted herd such cases will be few and far between. Further, we have experienced none of the unfavourable results that are put up by those opposing the test. In no case have we known in the many hundreds of animals we have had tested of an injury to the animal, neither have we experienced any trouble in abortion in cows tested, and we have had them tested at all stages of pregnancy.

We are firm believers in the tuberculin test, as we have described, and we are also firm believers in the Bang system, and until these are improved upon—if they can be improved upon—we shall practice both in the management of our herd. No matter what the practice and requirements of our government authorities may be, we on our part shall not relax our efforts in the direction I have stated, until all our herds are absolutely free from the disease, and until better means are known we shall always use the tuberculin test to ascertain the conditions of the health of our herds.

### *Education and United Effort Needed.*

Having given our practice on the farm, I may now be permitted, perhaps, to make a few general remarks. The discovery of the extent of the disease in the herds of various countries a few years ago caused such a commotion that most rigid enactments were passed by several legislative bodies; extreme conditions were imposed, doing unfortunately, in our opinion, a great deal of harm, arousing the antagonism of breeders and stockmen. Much of this legislation has been rescinded, and more reasonable measures are now adopted as a result of a greater knowledge of the subject. Mistakes, if there have been mistakes, were not wilful, but well intended on the part of the authorities of each country, but we submit that if the disease is to be eradicated from any country it must be through a campaign of education and united effort on the part of the breeders of the country. The exclusion of importations will never help to eradicate the disease just so long as the disease exists in the herds of the importing countries, and our veterinary authorities will do well to show the simplicity with which the disease may be eradicated, rather than impose unnecessary conditions.

Apart from the test and the application of the Bang system, cleanly and sanitary conditions, good ventilation and plenty of sunlight, and as much outdoor life as possible are the requisites. To the beginner in stock breeding we would advise great care in seeing to it that he begins his operations with animals free from disease, and that he attends well to his ventilation and sanitary conditions, and if at any time he buys to strengthen his herd, to see to it to a certainty that he does not buy disease with the animal.

To the breeder, small or large, who discovers the disease to exist generally in his herd, if the animals are of inferior pedigree and individuality, we recommend turning off to a butcher, to be killed under veterinary inspection, all animals that respond to the test, and begin anew; but in no case would we recommend the slaughtering of valuable animals where they are still in good breeding form and vigorous appearance, but we advise the system of separation we have described in this paper. The same full measure of separation may not always be possible, but the best that can be done should be done in each instance, and under no circumstances neglect the matters of ventilation, good sanitary conditions, plenty of sunlight, and as much open air life as possible. I am fully convinced of the reasonable possibility of the eradication of tuberculosis from our herds, and of the maintenance of sound herds, and my earnest hope is that our breeders may at no distant day be so educated in the direction I have endeavoured to describe that they will put into practice the only present known means of ridding their herds of a disease which in the past has been so destructive in its consequences.

# ANTHRAX AND BLACK-LEG.

By Dr. Charles H. Higgins, B.S., D.V.S., Pathologist, Department of Agriculture.

The title of my paper was not selected on account of its scientific value, nor on account of any original work accomplished by the writer in connection with either affection; but, rather, with a view to giving a comprehensive idea of the differences between these two affections to the general practitioner, which will enable him to more easily make a correct diagnosis, thereby causing a financial gain, not only to himself but to his client as well.

Some criticism may be offered at the common-place term used ('black-leg'), but I consider this advisable, owing to the idea which has gained ground in some sections, and I am sorry to say by some professional men, that the two diseases are similar in their nature and the methods of inoculation for their prevention.

The history of either disease can be traced back through the preceding centuries with little difficulty, even though the exact nature of their causative agent was an unknown quantity.

At the present time, through the perfection of our microscopes, we are able to detect the infective agent, not only of these two diseases, but the infective agent of the majority of the contagious diseases of man and animals. It is then apparent that we are indebted to the perfection of our microscopes, not only for the detection of the infective agents of the contagious diseases, but also for our present knowledge of their prophylaxis and preventive treatment.

To deal progressively with these two affections, I will cite circumstances which the country practitioner is liable to encounter in the regular routine of his practice at any time.

His services are required immediately; some cattle are dead, others are in a dying condition; the owner or owners are excited, and from the quick onset of the disease and the almost total absence of symptoms immediately suspect poisoning by a near neighbour with whom they are at loggerheads.

A careful and quick diagnosis is imperative, not only for the protection of the other animals on the farm, but, if the case be anthrax, for the protection of the human beings who may come in contact with the animals or their products after death.

In anthrax, the diagnosis may be established by the short duration of the illness; the animal may be of any age or variety; as a rule, appearing in perfect health the night before, and being found dead or nearly so in the morning. There is usually a bloody discharge from the nostrils and anus. This in itself should arouse suspicion, and make one particularly careful in handling the carcass, that he may avoid infecting himself or others, or distribute the infection over the ground when removing the carcass to a suitable place for burial. If there is still doubt, a few drops of blood may be obtained on a clean piece of notepaper, allowed to dry in the air before being folded, and forwarded by mail to a laboratory for microscopic examination, which examination will yield positive results.

If it is necessary to confirm the diagnosis immediately, an autopsy may be performed, but it must be borne in mind that this is a very dangerous procedure, and one which can usually be dispensed with even in the most remote sections.

At an autopsy on a case of anthrax, hemorrhages will be noted throughout all the tissues and organs of the body. The spleen will be greatly enlarged and very dark in colour. The blood flows freely, is of a dark colour, tarry, and does not coagulate.

The carcass of such an animal should be destroyed by fire as soon as the diagnosis is made or suspected, care being taken that all discharges and litter about the animal be burned with it, even to the halter. The animal should, under no consideration, be skinned, as this is a most dangerous procedure; nor should it be dragged over the whole farm with a chain around its neck or leg that a spot may be found where the digging is easy, for by this means the infection is very effectually spread, contaminating any inclosure through which the animal may be drawn.

Black-leg is a disease of the ox, and is seen more often in animals from six months to four years old. Its onset may be slightly longer than that of anthrax, the first symptom being usually lameness. Later an emphysematous condition of the skin covering the muscles is noticed, which gives an increased size to the quarter affected, and a crackling sound similar to the rustling of paper when the hand is passed over the area.

As a rule, there is no discharge from any of the natural openings of the body of a bloody character. The blood is coagulated and of normal colour. The spleen is normal. Congestion of the intestinal mucous membrane is at times present, and there may be some hemorrhages.

The skin covering the lesions is dry. The muscles are dark in colour, and decomposition takes place very rapidly.

The precautions taken in the handling of the carcass should be similar to those used in case of anthrax, although the danger to human beings is nil, but the danger of spreading the infection is as great.

With this disease, as with anthrax, there should be no difficulty in making a positive diagnosis in the field, but if it is desired to confirm the diagnosis, a few drops of bloody serum from the affected muscles, prepared in the same manner as blood from a case of anthrax, will yield positive results on microscopic examination.

Bacteriologically, the difference between the germs of anthrax and black-leg is as great as the difference in their lesions.

The anthrax germ is aerobic (i.e., grows only in the presence of oxygen), non-motile organism, a characteristic being the chain formation in artificial media or in the tissues.

The germ causing black-leg is anaerobic (i.e., grows only in the absence of oxygen), and is actively motile. Chain formation is not a characteristic.

Both germs form spores, which spores are capable of retaining their infective properties for an indefinite length of time. Either germ is easily propagated, provided suitable media and conditions are observed. Anthrax is easily stained, retaining the dye when treated by the Gram method. Black-leg bacilli are also easily stained, but do not as a rule retain the dye when treated by the method of Gram.

An opportunity for the treatment of animals affected with either disease is seldom obtained, and when such an opportunity is presented, it is usually fruitless.

The preventive inoculation against both affections is widely practiced, particularly in localities where it is known the infectious agent exists. The attenuated virus for the preventive inoculation is prepared in laboratories especially equipped for the work, of which there are many on this continent, some connected with the federal or state governments, others connected with firms who make a specialty of ‘ biological products.’

These vaccines when prepared with care and properly tested may be considered reliable. Anthrax vaccine as prepared requires two inoculations, the first preventing against infection by the second, and the second preventing against infection by a virulent germ. The interval between the two inoculations varies, but is usually from ten to twelve days. Black-leg vaccine is sold in two forms, the single and the double vaccine. The single vaccine is usually recommended for grade stock, while the double is for pure-bred animals; it being considered that a single vaccine which will act as a preventive against an active infective agent is too strong for pure-bred animals, which are considered more susceptible, owing to their high breeding. The method of applying black-leg vaccine is various, and is usually characteristic of the manufacturer, each firm desiring to obtain a method which is very efficacious and simple, that it may be placed in the hands of the layman as well as the veterinarian. The results of vaccination against either infective agent are considered successful.

# FOOT AND MOUTH DISEASE.

Canadian stock owners and veterinarians have been fortunate in that hitherto they have had little need for knowledge of Foot and Mouth Disease. Its recent appearance in New England however, has suggested the advisability of issuing a brief bulletin giving a general description of the disease in question, its symptoms and treatment and the various channels through which it spreads.

This malady has many other names as Eczema Epizootica, Epizootic Aphtha, Aphthous Fever, &c., but it is now commonly known in English speaking countries as Foot and Mouth Disease, owing to the fact that its specific effects are, as a rule, more readily observable in connection with the feet and mouth than elsewhere, although the skin and mucous membranes generally are also affected.

There is conclusive evidence of the existence of this disease in Europe before the middle of the eighteenth century.

It first appeared in Britain, so far as is certainly known, in 1839, and from that date until a very few years ago, it was one of the most persistent scourges of the herds and flocks of the mother country. For eight or nine years back, however, it has been kept under control, and although it has been introduced several times, it has never been permitted to extend its ravages.

It was first observed in Canada in August, 1870, having been introduced by cattle landed at Montreal. A number of herds in Quebec, Ontario and the North-eastern States became involved, but the infection did not survive the winter.

In 1875 it appeared near Toronto in some imported sheep, and although it spread to some extent, it was stamped out through the well directed efforts of Professor Smith who, however, attributes his success largely to the advent of cold weather.

In 1884 a slight outbreak occurred in cattle landed at the quarantine station at Point Lévis, but the prompt measures adopted by my predecessor prevented its obtaining a foothold in the country.

The exact nature of the germ to which Foot and Mouth Disease owes its existence is not yet definitely decided. It is not of a fatal nature, the rate of mortality, in ordinary outbreaks, seldom exceeding one or two per cent of the adult animals affected. It causes, however, great financial loss to stock owners through shrinkage of flesh, milk and general condition, while abortion in pregnant animals is very common, and in severe cases troublesome complications are liable to persist long after the disease itself has run its course in the herd.

Originally it appears to be a disease of cattle, but it is easily transmissible to sheep, swine and poultry as also in a less degree to horses, dogs, cats and other animals, while man himself is by no means immune. It is, without doubt, one of the most infectious diseases known, and the many different ways in which its germs are conveyed from place to place, render it very difficult to prevent its spread once it has made its appearance in a community.

As all the natural discharge of an affected animal are highly infective, and as same of them, particularly the saliva, are largely increased during the attack, the disease is readily conveyed to other animals by these media.

Fodder of every kind, including grass, readily becomes infected and when eaten by healthy animals will, in the majority of cases, produce the disease, while water is a frequent agent in its transmission. Halters, blankets, brushes, brooms, and pails are all sources of danger as is also the manure from infected animals. The disease has frequently been conveyed from farm to farm through the clothing of attendants and others and by the feet not only of affected animals, which, especially in the secondary stages of the attack, are exceedingly active agents in the dissemination of the infection, but of men, dogs, birds and other creatures.

The period of latency may extend from twenty-four hours to as many days, but once introduced in a herd, the disease will generally develop within a week.

### SYMPTOMS.

The first symptoms shown by an affected animal are shivering, staring coat, arching of the back, stiffness, especially when the feet are involved, and loss of appetite. The sufferer will leave the herd and there is a tendency to seek shelter and warmth. There is always a decided rise of temperature which may reach 105° or 106°, although this may be unaccompanied by a corresponding increase in the pulse rate. Constipation is generally present and the action of the kidneys is likely to be irregular. Mucous discharges from the eyes and nose are often present and, especially in cold weather, there may be more or less coughing.

The premonitory symptoms as given above are shortly followed by the more definite local phenomena which characterize the disease. Among these, one of the first to be noticed in cattle is a peculiar smacking of the lips, accompanied by a profuse discharge of frothy saliva. This symptom is soon followed by the eruption in the mouth of the characteristic vesicles of the disease. These are generally first observed on the dental pad, one or more at each angle, seldom in the middle, although they may subsequently coalesce. They are soft, fluctuating and unaccompanied by any inflammation of the surrounding tissues, which are in fact generally somewhat paler than the rest of the mucous membranes. These are followed by similar though somewhat larger vesicles or blisters on the upper surface of the tongue. On this organ, although large in size, they are seldom numerous. Owing to the density of the mucous membrane they do not break readily, and may under run and unite, forming eventually large and very painful sores. Vesicles are frequently seen on the membrane lining the cheeks and palate, as also on that of the lower lip and occasionally on the muzzle. If these vesicles are not accidentally ruptured by the attempts of the patient to eat hard or coarse food, they burst spontaneously on reaching maturity. They contain in the early stages a yellowish lymph-like fluid which, however, becomes gradually more opaque. They leave raw, red and painful erosions which sometimes, persist for a considerable time, especially if irritated, as unhealthy ulcers, but which under favourable conditions, heal naturally although always somewhat slowly.

The saliva which in the early stages is thin and frothy, gradually becomes thicker and hangs in ropes from the mouth, infecting, especially after the vesicles rupture, everything with which it comes in contact.

A second crop of vesicles is occasionally thrown out. These are less in area but deeper and accompanied by more inflammation of the surrounding tissues.

In cows the udder often becomes affected, the lesions on that organ particularly in deep milkers or newly calved cows, being very serious and extensive. More or less inflammation is always evident, followed in a few hours by the development, usually on the teats, of the characteristic vesicular eruption. If left undisturbed, the vesicles generally burst within twenty-four or thirty hours of their appearance, although they sometimes dry up and scale off, their contents becoming absorbed. As a rule, however, they leave raw, purulent sores, which, if irritated by the hands of the milker or otherwise, are very apt to run together, sometimes extending over and blocking up the opening of the teat, causing congestion and possibly inflammation of the quarter affected. Secondary visicles not unfrequently appear on the udder. The function of this organ, which is always more or less impaired in animals giving milk, is of course seriously interfered with and may be altogether suspended upon the development of the local lesions above described. The milk in almost all cases is unfit for use. It not only becomes thick, yellow and offensive, but it is exceedingly fatal to young animals, causing death very suddenly, either from acute inflammation of the stomach and bowels, or by direct toxic action. In the human species it is highly dangerous to infants, and even in adults, it will in some cases transmit the disease, while in others it will produce serious gastric and intestinal disturbance. It may be rendered harmless by boiling or by the addition of salicylic acid, but even when so treated cannot be recommended as an article of diet.

In some outbreaks the external generative organs, both male and female, show the characteristic lesions of the disease, giving rise to much irritation and occasionally to severe inflammatory changes.

Some authorities state the disease at times affects the base of the horns, causing loosening and sometimes loss of these appendages, but this is of rare occurrence.

There is, however, no doubt that the skin, as a whole, is more or less affected in every instance, although, save in exceptionally severe cases, the lesions are apparent only on the thinner and more delicate portions.

Foot lesions in cattle are first indicated by lameness generally, though not invariably, sudden in its onset. This may affect one foot or it may involve them all. In the latter case motion is of course exceedingly painful and difficult, especially on hard or stony ground or among stubble. The animal will frequently, in the early stages be seen to shake the affected foot or feet, as if a stone or other foreign body were lodged between the digits.

As the pain in the feet, especially if all are involved, becomes more severe, the suffering animal will lie almost constantly, and while in this position will drag itself about in order to feed rather than attempt to rise and walk. In mild cases, relief is evidently obtained by standing in water or in cool wet marshy spots. On examination, pain, heat and swelling will be detected round the coronet, while, in white or light coloured cattle, redness of the part is also present.

Within twenty-four hours, as a rule, from the first appearance of lameness, the vesicles or blisters characteristic of the disease may be observed. These in cattle are generally confined to the hairless tissue about the junction of the digits, although they may, and frequently do, occur high up in the heel near the small horny excrescences in that region.

A few hours after their appearance these vesicles burst, discharging a clear yellowish fluid, and leaving bright red, angry sores showing ragged, whitish edges. These sores ordinarily heal rapidly, seldom leaving any scar or other bad result. Occasionally, however, more especially when affected animals have been driven some distance, a severe inflammatory action takes place, giving rise to serious local complications, such as shedding of the hoof, inflammation of the coronet or of the delicate internal structures of the foot, open joint, or even gangrene (mortification) of a portion or the whole of the extremity.

In sheep the disease is generally confined to the feet, only a small percentage of these animals presenting mouth lesions, which, when they do appear, resemble closely those already described in the case of cattle. The feet of sheep, however, are usually affected in a manner somewhat different from those of the larger animals. The vesicles are more frequently situated at the heels or directly on the coronet, than at the openings of the inter-digital space, their favourite seat in the bovine species. Owing to this circumstance, a gradual casting and renewal of the hoof is a not uncommon sequel of the disease in sheep. When this occurs, the new hoof, slowly growing downward from the coronet, displaces the old one, which, however, is not cast off until its successor is almost fully developed.

In the pig the mouth symptoms are slightly different from those shown by cattle and sheep, inasmuch as the vesicles are generally more in evidence on the snout and lips than on the tongue and inside the cheeks. The mammary glands are frequently involved. Except for a more acute and exceedingly painful laminitis, accompanied by a tendency to the abrupt shedding of the hoof, the foot lesions of the pig are almost identical with those of the sheep.

### TREATMENT.

The constitutional treatment in ordinary cases is very simple. It is generally advisable to move the bowels slightly, for which purpose a moderate dose of Epsom salts will be found most suitable. Should the temperature remain elevated, a few doses of nitrate of potash or hyposulphite of soda may be easily administered in the drinking water. Complications must be specially dealt with as they appear. In lingering cases or where great weakness supervenes, benefit will result from the judicious use of ale or stout combined with vegetable tonics. The food supplied should in all cases be soft and easily masticated, as gruel, mashes, green grass, steamed hay, ensilage, &c. If roots are given they should be pulped. Careful attention to this phase of the treatment is demanded.

Local treatment is also simple. The vesicles should under no circumstances be intentionally ruptured, but must be allowed to burst of themselves, after which they may be dressed several times a day with a solution of alum, borax, iron sulphate or salicylate of soda, to which may be added a few drops of creolin or carbolic acid. Where unhealthy sores or ulcers occur, extending into the deeper tissues, the careful application of a mild caustic may be necessary. The feet should be kept as clean as possible. The sores resulting from the rupture of the vesicles may be dressed with the agents mentioned above as suitable for the mouth, although in some cases they may be used in stronger solution. For this purpose foot baths are useful, more especially as many affected animals like to stand in water or moist places.

A convenient mode of dressing the feet when animals are affected in large numbers is to drive them, once or twice a day, through shallow troughs containing the solution which it is desired to apply.

The udder when involved should be carefully handled; to prevent irritation from the hands of the milker it is advisable to use a teat siphon.

The foregoing is a brief summary of the methods hitherto in vogue, but within the last eighteen months an important discovery has been made by Professor Baccelli, a noted Italian pathologist, which, it is claimed, will revolutionize the treatment of foot and mouth disease.

Professor Baccelli's method consists in the injection of a solution of corrosive sublimate into the veins of affected animals.

The dose for an adult of the bovine species is about one grain. It is administered in combination with common salt solution. Its effects are said to be marvellous.

If administered before the development of clinical symptoms the progress of the disease is at once arrested, the only noticeable feature being a slight elevation of temperature.

In the more advanced stages of the attack the results are said to be even more striking, the temperature being almost immediately lowered, while the ulcers assume a healthy aspect, the appetite returns, lameness disappears and no secondary lesions occur. Even in the worst and most severely complicated cases, it is claimed that this simple remedy will check the disease and save the lives of the animals.

There has fortunately been no opportunity for this department to test the truth of these statements, but as they are made on excellent authority, it will be well to bear them in mind should the disease ever make its appearance in the Dominion.

### PREVENTIVE MEASURES.

Once the disease is recognized, every possible effort should be made to prevent its spread. This, owing to the ease with which the infection is disseminated, is a matter of very great difficulty.

All movements of animals should be immediately stopped, and those affected isolated at once. If the outbreak is small and localized, slaughter may be advisable, especially as the flesh of animals affected with the disease in its ordinary form may be used with impunity.

In any case the most stringent precautions should be adopted to prevent the conveyance of the contagion to other premises or to animals not yet affected. Bedding, manure and rejected fodder should be burned, or failing this, thoroughly mixed with fresh lime, carefully guarded and buried or ploughed in as soon as possible. Carcasses of animals dead of the disease should be burned, and their hides or wool, if removed, carefully disinfected; this latter precaution of course applying also to the hides or wool of animals slaughtered. All clothing, halters and stable utensils are active infective media, and should either be burned or carefully disinfected.

Buildings, fences and other fixtures should be treated with hot steam or boiling water before being coated with lime wash containing a liberal allowance of chloride of lime, creolin or crude carbolic acid. Infected or suspected stock cars and yards, as also ships or boats which have conveyed diseased animals, should be dealt with in a similar manner.

The disease is frequently conveyed from place to place by human agency. Attendants, owners, interested neighbours, veterinary surgeons and inspectors should all exercise the greatest care in the disinfection of clothing, hands, boots, instruments, &c., after being among or in proximity to affected animals.

Dogs are very liable to convey the disease to or from neighbouring farms and should be closely confined when it is known to exist in any district.

Foot and Mouth Disease generally runs its course in from two to three weeks, but the contagion may retain its activity under favourable circumstances for a long time. Stables have been known to remain infective for twelve months, while in one case, troughs lying in an open field infected cattle after four months. One attack confers immunity for about five months, but animals readily become re-infected in subsequent outbreaks. Inoculation with a mixture of the blood of animals recently recovered and the lymph from active vesicles is said to convey similar immunity without producing the disease in an acute form. Ordinary inoculation is frequently resorted to in order that the duration of an outbreak may be curtailed by having all the animals in a herd affected at the same time.

Should the disease unfortunately appear in Canada no time should be lost in communicating the fact to the Department of Agriculture at Ottawa. Under the provisions of the Animal Contagious Diseases Act, persons concealing its existence are liable to a penalty of two hundred dollars.

J. G. RUTHERFORD, V.S.,
*Chief Veterinary Inspector*

## No. 54.

# COMMISSIONER'S REPORT—FIFTH NATIONAL EXHIBITION—OSAKA, JAPAN, 1903.

## REPORT OF THE FIFTH NATIONAL INDUSTRIAL EXHIBITION HELD AT OSAKA, FROM MARCH 1 TO JULY 31, 1903.

This exhibition was the fifth of a series of national exhibitions that have been held at different cities in Japan, under the direction of the Imperial Government. The city of Osaka, having risen to considerable importance as a commercial centre, was chosen as the location for the fifth national exhibition to be held from March 1 to July 31, 1903. Previous to this, the exhibitions had been of a purely domestic character, but at the Osaka exhibition, a new and special feature was the introduction of a section set apart for the display of exhibits from foreign countries.

The official invitation to Canada was conveyed by Honourable T. Nosse, Consul General for Japan in Canada. As the occasion was to afford an excellent opportunity for the exploitation of our products and manufactures in Japan, the invitation was accepted, and instructions were given to this branch to prepare a suitable exhibit.

Application was made for a space of 10 thousand square feet for the accommodation of Canadian exhibits, but it was learned that such an area would not be available in what was known as 'the foreign samples building.' The Japanese government, realizing the importance and size of our proposed exhibit, offered to erect a special building with a floor area of 7,200 square feet for the exclusive use of our government. for a rental charge of $2,525, an amount equal to half the cost of its construction. Plans were submitted with the proposal, and being found suitable, the offer was accepted. The work of construction was at once commenced and the building was ready according to agreement, on January 15, 1903. Our thanks are due to the officials of the exhibition for the prominent position given to our building. It was situated in one of the best possible locations in the general group of buildings, and in close proximity to the Art Gallery, which formed the centre piece of the whole exhibition.

The Dominion of Canada was the only government which occupied a special building, in fact, it excelled all other foreign countries in the number, variety, and artistic arrangement of exhibits. The only countries represented by government exhibits and commissioners, were Korea, Netherlands, India, State of Oregon, U.S., and Canada. The rest of the foreign exhibits consisted of displays made by private firms, through their agents in Japan.

The rules of the exhibition precluded foreign exhibits from competition for awards. This being the case, it was decided that this government should arrange for a collection of such products and manufactures of Canada, as were marketable in Japan, and exhibit them as types, or samples, of what our producers and manufacturers at large were capable of supplying.

The exhibits consisted of the following:—

Grains and grasses of Canada, minerals of Canada, statistics of Canada, scenic views of Canada, fruits—viz.: 50 varieties of apples, fruits preserved in antiseptic fluid, showing all the varieties of fruit grown in Canada, Canadian 'hard wheat flour, demonstration of process of making bread from Canadian hard wheat flour, bread and buns, baking machinery—oven and mixer, cereal foods, canned goods—fruits, vegetables, soups, meats, fish, condensed milk and cream, biscuits, furniture for houses, offices and schools, metal ceiling and roofing, hardware: nuts, bolts, nails, screws, wire and chain, cordage, bicycles, rubber goods, salt, whiskey, butter, cheese, hams. bacon, maple sugar, maple syrup, honey, timber, lumber, sash and doors, pulp wood, wood pulp, printing and other paper, indurated ware, cooking ranges, kitchen utensils, oil stoves, cold storage plant, pianos, model of C.P.R. sleeping car, model of C.P.R. steamship Co. steamship '*Empress of Japan.*'

All of the above were installed in the Canadian building in time for the opening day, March 1.

The number and variety of our exhibits, and the novel method of their installation created an intense interest among the visitors to the exhibition. The native newspapers referred to the Canadian exhibits as 'the sensation of the exhibition.' Canada was hitherto comparatively unknown in Japan, and here for the first time, the abundance and variety of her natural and industrial resources were displayed in the Far East. By the exhibition officials, the Canadian exhibit was regarded as the leading feature and attraction of the exhibition, and was widely advertised as such. The building was crowded every day from morning till night. The total attendance at the exhibition was over 4,000,000, and included many nationalities besides Japanese; thus the influence of our exhibit may be expected to extend, not to Japan alone, but to China, Russia, India and other countries.

While stated above that no awards were given to foreign exhibitors, the Japanese government considered our exhibit worthy of some special recognition on account of its specially attractive arrangement and the great object lesson it afforded to their people. We were honoured by receiving a beautiful silver medal as a token of their appreciation of our display, and in addition, a special letter of thanks was given to each of the contributors to our exhibit.

## THE OFFICIAL VISIT OF THE HONOURABLE MINISTER OF AGRICULTURE TO THE EXPOSITION.

The Japanese attached much significance to the presence at the exposition of Honourable Sydney Fisher, who went to Japan as Commissioner Extraordinary from Canada. This graceful act of international courtesy was duly appreciated by the imperial government and the people of Japan generally, and did much to promote the social and commercial relations between Canada and Japan.

As a special mark of favour, and as an evidence of the friendly relations existing between the two countries, their Imperial Majesties the Emperor and Empress of Japan, paid a special visit to the Canadian building. They were received by the Honourable Sydney Fisher, and conducted through the building and among the several exhibits, each of which was explained by the aid of an interpreter. Other visitors of note during the exposition were the Crown Prince and Princess and other members of the royal family, His Excellency Marquis Ito, the Prime Minister, members of the cabinet, and the Crown Prince of Siam, and many others.

A cold storage chamber occupied the centre of the Canadian building. This formed the centre piece of our exhibit, and was most artistically decorated with various Canadian grains and grasses, while on the top was a hugh crown covered with the same material. Three sides of the structure were utilized as show cases. These cases were used for the display of perishable products, such as apples, butter, cheese and meats. Several hundred plates of apples representing over fifty Canadian varieties were displayed on shelves. Butter, cheese, hams and bacon were also shown. Our fruits were highly commended for their beauty, flavour and keeping qualities. The cold storage case and its contents were an object of special interest to the people of Japan. Never before had they seen such a variety of fruits, nor the modern method of preserving them by means of cold storage.

## CANADIAN HARD WHEAT FLOUR.

The most effective part of the Canadian exhibit was the daily demonstration in bread making by the use of Manitoba hard wheat flour. In the past large quantities of winter wheat flour have been imported into Japan each year from Washington and Oregon, while Canadian hard wheat flour has been comparatively unknown. In order to demonstrate the superior value of Canadian hard wheat flour, a model bakery was installed, and the entire process of bread making was carried on in full view of the public. Under the direction of an expert baker from Canada, Japanese bakers were instructed in the use of hard wheat flour, and they became readily convinced of the economy of its use. The tests made proved to their entire satisfaction that while the cost of Canadian hard wheat flour was a trifle higher than winter wheat flour, the increase in the number of loaves produced by the former per barrel was more than the difference in the cost. In addition to the increase in the production, it was also clearly demonstrated that hard wheat flour produced a larger loaf of fine cellular construction and a rich nutty flavour, and was capable of retaining its freshness and flavour up to five or six days after leaving the oven. This was a striking contrast to the results obtained by using winter wheat flour. Here the result was a small-sized dry, hard loaf of little or no flavour, which dried up and became almost brittle when two days old.

The use of bread is becoming more common every year among the Japanese, and this demonstration of the superiority and relative economy of Canadian hard wheat flour has laid the foundation of what will, in a few years, become an enormous trade, not only in Japan, but throughout the far east generally. With our vast resources of wheat in western Canada, our milling and transportation facilities, we have every means and many advantages which enable us to supply flour to Japan and the far east. Flour is also utilized by the Japanese in the manufacture of macaroni and other paste foods. Samples of Canadian hard wheat flour were distributed among the leading manufacturers, for the purpose of having tests made alongside of winter wheat flour. In every case it was reported that Canadian flour proved the best in both quality and yield.

## WHEAT.

There are several large flour mills in the northern part of Japan. The low quality of the native grown wheat produces a flour of a like character, and a certain amount of imported wheat has to be used for mixing in order to bring the quality of the flour up to a fair standard.

The Japanese have adopted the policy of importing raw material wherever practicable and completing the manufacture in their own country and with their own labour. This policy may be applied to the manufacture of flour, in which case, our Canadian producers and shippers of hard wheat will be able to cater to their wants with many favourable advantages.

These mills are even now turning to Canada for supplies of hard wheat, and if due attention is given to the wants of this market, it is not without the range of possibility to expect that in the near future a large part of our hard wheat may find an outlet westward via Vancouver for export to Japan and the far east.

## TIMBER AND LUMBER.

Our exhibit of timber and lumber consisted of a large tree-section of British Columbia pine, dressed lumber, sash and doors. There is a large market in Japan for these lines, and we learned that while the products of our Canadian forests are in use in Japan, they have been sold there as being the product of Oregon and Washington. Our British Columbia fir, which is unequalled in the world, has been shipped to Japan under the name of Oregon pine. The white ant is a formidable enemy to all foreign woods in the far east. A prominent lumber concern in Manila conducted a number of tests with foreign woods, for the purpose of ascertaining what kinds would successfully withstand the attack of this pest. Fir from British Columbia was among the woods tested, and it was found to be the only variety capable of fully resisting the ravages of this insect. It would be well for Canadian lumber interests on the Pacific coast if sales could be made direct, and explicitly specify that the woods supplied are of Canadian origin. By doing this the trade will be turned to what will in a short time be the only source of supply for large timber and lumber, as it is a well known fact that the forests of the Pacific coast states are being rapidly depleted. A large amount of railway construction and ship building is being carried on in Japan from year to year, and the demand for timber and lumber is a constant one.

We believe that box shooks could be marketed in Japan. Boxes and cases for export merchandise are wanted. There is no reason why a good machine made box could not be sold in competition with the hand made article now used in Japan. These boxes should be of light material and knocked down for shipment.

## FURNITURE.

With the modern civilization which has sprung up in Japan, there has been created a tendency towards furnishing, at least, a part of the house in European fashion. Banks and large business houses are commencing to use our modern office furniture, such as roll-top desks, &c., &c. In addition to this, there is the ever present demand among the foreign residents for the latest ideas in household furniture. The Japanese attempt to imitate our styles in furniture, but owing to the lack of woods and to their crude workmanship, their product is far from being equal, either in durability or style, to the highly finished goods which our Canadian factories are capable of turning out. Furniture should be shipped in 'knocked down' shape in order to economize in the matter of freight charges. The ordinary class of furniture could be sent over in the 'white' and the varnish or paint put on by Japanese workmen.

## SCHOOL DESKS.

Samples of double and single school desks were exhibited. The demand for high grades of these goods will be comparatively small, in fact, their sale will be limited to a few of the higher schools and colleges attended by the better classes.

## MUSICAL INSTRUMENTS.

A beautiful upright piano was displayed as a type of our Canadian workmanship in that line. It was greatly admired, both for its tone and artistic finish. It was finally sold to the household of His Imperial Majesty the Emporer of Japan, for use in the Palace at Tokio. There is a limited demand for medium priced pianos and organs. Owing to the humidity in the climate of Japan, these instruments should be made as much proof against damp as possible.

## STOVES AND COOKING UTENSILS.

This exhibit consisted of cooking ranges, oil stoves and cooking utensils. As the people come nearer the European mode of living, cooking ranges will become a necessity. Even now, there is a good demand for a cheap cooking range adapted for the use of coal, coke or wood. The several cooking utensils which usually accompany these stoves are also required. Coal oil stoves are in good demand, their use being quite general on account of the cheapness of kerosene.

### HARDWARE.

A complete display of nuts, bolts, nails, wire rope chains, and horse shoes was made on neatly arranged pedestals. The annual import of these articles is large, the supplies coming from Great Britain, Germany and the United States. If our manufacturers can meet this competition, a good business can be done.

### BICYCLES.

This exhibit consisted of a large frame to which was attached the various parts of a complete bicycle. The use of the wheel in Japan is increasing. The splendid roads in the cities and country make this means of locomotion convenient and pleasant. Bicycles intended for this market should be strong and cheap, so as to be within the reach of all classes. There will be no sale for ladies' wheels until the women change from their present style of dress to that of European. Automobiles are becoming quite popular in the country, several having been adopted by the Imperial government in its postal service. Horses being scarce, it is possible that automobiles may in time, become the means of transportation between places where there is no connecting railway.

### CORDAGE.

A ton of hemp rope of various sizes was piled in pyramid form in a prominent location in the Canadian building. There is considerable rope manufactured in Japan, and also in Hong Kong. It is used principally in the shipping trade, and the sales are large. Cheap labour and proximity to raw materials tend to its cheapness, and it is doubtful if our factories can successfully compete.

### RUBBER GOODS.

Our display in this line was very complete, consisting of rubber clothing, mechanical rubber goods, drug sundries, such as hot water bags, atomizers, &c., &c. Rubber clothing, such as rubber boots and rain-proof coats are required in the northern part of the Empire, where the winter season is unusually wet and slushy. A good trade has been done by the United States manufacturers in all lines of rubber goods, and by the introduction of our Canadian rubber goods, a fair amount of business can reasonably be expected, if our manufacturers will take the matter up.

### METALLIC CEILING AND ROOFING.

In order to demonstrate the utility of metal as a substitute for wood or plaster in building, an artistic display of metal ceiling, shingles, &c. ,&c., was arranged in a prominent location, where its several uses could be illustrated. This class of interior and exterior finish. was comparatively unknown to the Japanese, and many inquiries were made regarding its composition, cost, &c., and where it might be obtained. There is a splendid opportunity for good business in this line, as there are several points to commend its use in Japan. A few of the reasons are:

First, its comparative cheapness and durability, as compared to wood and plaster for interior work or for shingles on roofs.

Second, its proof against fire, for in Japan fire is the constant dread of the people; large conflagrations being of frequent occurrence.

Third, the frequent earthquakes which occur in Japan cause considerable inconvenience and expense by the collapse of plastered ceilings.

The government offices, banks, schools and large business firms of Japan, occupy buildings fully as pretentious both in size and architectural design as those of Canada or the United States. In buildings of this class, where repairs or changes affecting the walls of roofs are necessary, or in new buildings to be erected in the future, metallic work will find favour. Our manufacturers will do well to take advantage of our work of introduction by establishing good selling connections in Japan.

### BUTTER.

Butter is a comparatively new acquisition to the diet of the Japanese. Its introduction came with the use of bread, and the combination may now be regarded as a portion of the bill of fare, of at least one meal a day. With the foreign residents, good butter is always in great demand. The market is supplied from many sources, chiefly France and the United States. Canadian butter holds a high place among its different competitors, and as a result of the advertising done at the exhibition, connections have been made with several first-class firms in Japan, who will henceforth handle Canadian butter in large quantities.

At one time oleomargarine was largely used by the Japanese, but returns of the imports for the last few years indicate that the amount of imitation butter imported is decreasing every year, while the imports of pure butter are increasing very rapidly.

### CHEESE.

The Japanese have not yet acquired a taste for cheese, and for the present, sales are confined to the foreign residents. It is safe to predict, however, that when the use of butter becomes more general, the Japanese will take more kindly to cheese.

### HAMS AND BACON.

The annual consumption of ham and bacon is comparatively small, but the comparison of the imports for the last few years indicate that their use is becoming more popular. The supply is almost entirely imported from the United States. The foreign residents and hotels require these goods constantly, and with them, the selection is a matter of quality rather than price. Canadian hams and bacon enjoy an excellent reputation for quality in both our home and European markets, and they can compete very favourably in quality and price with any goods now on sale in Japan.

### CANNED GOODS.

The exhibits in canned goods consisted of fruits, meats, soups, fish, vegetables, condensed milk and cream. The products of our different Canadian canneries were arranged in graceful pyramids, being used as a covering for posts which, of necessity, occurred in several parts of the building. The number and variety of our exhibits in canned goods, was favourably commented upon, and as there is a market in Japan for all of these goods, our Canadian packers will find this introduction of Canadian canned goods of great assistance if they wish to invade this market.

### BISCUITS.

A large pyramid showing nearly four hundred varieties of plain, fancy and mixed biscuits occupied a prominent place, and attracted considerable attention. English firms have been supplying the wants for this market, and considerable trade has been done, especially in sweet biscuits; the Japanese being fond of anything sweet. Of late years several factories have been started in the country, all equipped with modern machinery, and it seems as if the demand will in time be supplied by the local factories, and the foreign competition eventually shut out.

### PULP AND PULP PRODUCT.

The exhibit of Canadian pulp wood, pulp and paper was a large one and aroused considerable interest on account of its combined commercial and educational features. It also conveyed a powerful object lesson of our vast resources of pulp wood, and also of the industrial efficiency of our manufacturers. The arrangement consisted first of a display of tree sections of the three principal pulp woods of Canada, namely: spruce, poplar and balsam. This was followed by samples showing the result of the different stages of manufacture, after which came a complete display of the finished products, such as printing paper, wrapping paper, wrinkled paper, tissue paper, pails, tubs, wash-bowls, &c., &c.

The Japanese are ever eager for knowledge, and as a result, have developed a taste for reading. Newspapers with enormous circulations are common in the different cities, while books and magazines are always in good demand. Japanese paper is not suitable for newspaper printing, or for books or magazines where a paper with a glazed surface is required. Our Canadian manufacturers can reach this market without any disadvantages, and our pulp manufacturers will find a sale for pulp board; the latter is imported to Japan, where the manufacture of paper is completed by local mills.

### GENERAL REMARKS.

The foregoing pages include only a few of the many commodities which Canada can supply to Japan under favourable conditions. In Vancouver, B.C., Canada has a seaport nearer to Japan, both in time and distance, than any other port on the Pacific coast. The source of supply of such products as wheat, flour, lumber, fish, &c., is within easy reach of our western sea-board, thus placing us in the way of doing a large part of the trade with Japan in these lines.

It should be remembered that Japan is now the most progressive nation in the far east, and the result and effect of her progress is being watched by the neighbouring nations who may be expected at any time to follow the lead of Japan in the march of civilization. This will mean that they will become importers of the same goods as are now sold in Japan.

During the period of the exposition every means was used to make Canada and her resources, both natural and industrial, familiar to the Japanese and the other foreigners who attended the exposition. A book descriptive of Canada and her resources was distributed in both English and Japanese. Neat banners were hung in different parts of the building, on which were written in Japanese characters, sentences containing pointed facts as to the capacity of our Canadian producers and manufacturers to cater to the Japan trade. Copies of the Canadian trade index were distributed throughout hotels, chambers of commerce and leading business houses in Japan and China. In addition to this, our staff was continually engaged in interviews with parties interested in the purchase of Canadian goods, with the result that several business connections were formed and orders actually sent to Canada, which have, in some cases, to our certain knowledge, been repeated several times. Before returning to Canada we placed agencies for several lines of Canadian goods with reliable firms in Japan. It only remains for our Canadian producers and manufacturers, to follow up the excellent impression which our Canadian exhibits have made in Japan by exerting their utmost and immediate efforts in order to reap the benefit of the advertising which our government has done. They can be assured of not only a large trade, but one far reaching and permanent.

### COMMERCIAL MUSEUMS.

The government of Japan maintains commercial museums in the principal cities. These museums have a section allotted for permanent exhibits of a foreign nature.

There is no charge for space or for the care of exhibits, and any of our manufacturers wishing to place samples of their goods in these museums, can arrange to do so through the Department of Agriculture and Commerce of Tokio, Japan.

### CUSTOMS DUTIES.

While the customs tariff of Japan has preferential features which apply only on certain articles from countries with which Japan has commercial treaties, it happens that the articles specified are not generally of Canadian production or origin. In most of the lines which we can supply, we are placed on equal terms with other countries.

### TRADE MARKS AND PATENTS.

Canadian trade marks and patents have no protection at present in Japan. In view of the opportunity afforded for the sale of certain lines of manufactured goods on which it is desirable to protect the patent rights, I would respectfully suggest that the Canadian government should negotiate for recognition and protection of Canadian trade marks and patents in Japan.

WM. HUTCHISON,
*Exhibition Commissioner.*

# INDEX TO APPENDICES

## PUBLIC HEALTH.

PAGE.

No. 1. Report of the Director General of Public Health, F. Montizambert, M.D. Edin, I.S.O., F.R.S.C., D.C.L., &c.

Dominion Department of Public Health . . . 3
Bubonic Plague . . . 4
Plague and fleas . . . 13
Destruction of rats on shipboard . . . 14
Haffkine's Prophylactic . . . 15
Cholera . . . 16
Yellow Fever . . . 18
Small-pox . . . 20
The red-light treatment of Small-pox . . . 21
Chloroform in the preparation of Vaccine . . . 23
Glycerine in the preparation of Vaccine . . . 25
Leprosy . . . 26
Beri-Beri . . . 29
Immunization to the bacillus Typhosus . . . 31
Tuberculosis . . . 32
Congresses and meetings . . . 34
The Quarantine Stations, &c . . . 36
  Grosse Isle, Que . . . 36
  Halifax, N.S . . . 36
  St. John, N.B . . . 36
  Sydney, C.B . . . 36
  Chatham, N.B . . . 37
  Charlottetown, P.E.I . . . 37
  William Head, B.C . . . 37
  Victoria, B.C . . . 37
  Vancouver, B.C . . . 37
Temporary Frontier and Coast inspection . . . 37
The North-west Territories . . . 37
The Yukon Territory . . . 38
Leper Lazaretto, Tracadie, N.B . . . 38
Public Works Health Act . . . 38

2. Report on St. Lawrence Quarantine, G. E. Martineau, M.D . . . 39
3. " on Halifax, N.S., Quarantine, N. E. Mackay, M.D., M.R.C.S . . . 40
4. " on St. John, N.B., Quarantine, J. E. March, M.D . . . 43
5. " on North Sydney, N.S., Quarantine, H. Rindress, M.D . . . 44
6. " on Charlottetown, P.E.I., Quarantine, P. Conroy, M.D . . . 44
7. " on Chatham, N.B., Quarantine, J. Macdonald, M.D . . . 45
8. " on William Head Quarantine, A. T. Watt, M.D . . . 45
9. " on Bacteriological Work at William Head, B.C., W. H. K. Anderson, B.A., M.B . . . 47
10. " on Victoria, B.C., Quarantine, R. L. Fraser, M.D . . . 48

PAGE.
No. 11. Report on Vancouver, B.C., Quarantine, L. N. MacKenzie, M.D. . . . . . . . 45
12. " on outbreak of Small-pox in the North-west Territories, Jas. Patterson, M.D. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 49
13. " of Physician to the Leper Lazaretto, Tracadie, N.B., A. C. Smith, M.D. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 50
14. " of Public Works (Health) Inspector, C. A. L. Fisher, J.P. . . . . . 51

## HEALTH OF ANIMALS.

15. Report of the Chief Veterinary Inspector, J. G. Rutherford, V.S. . . . . . 69
Hog Cholera. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 72
Tuberculosis. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 76
Glanders. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 77
Pictou Cattle Disease. . . . . . . . . . . . . . . . . . . . . . . . . . 79
Actinomycosis. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 80
Actinobacillosis. . . . . . . . . . . . . . . . . . . . . . . . . . . . 80
Anthrax. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 80
Black-quarter. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 80
Mange in Cattle. . . . . . . . . . . . . . . . . . . . . . . . . . . . 80
Mange in Horses. . . . . . . . . . . . . . . . . . . . . . . . . . . . 81
Sheep Scab. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 81
Swamp Fever. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 81
Typhoid Influenza. . . . . . . . . . . . . . . . . . . . . . . . . . . 82
Foot and Mouth Disease in New England. . . . . . . . . . . . . . . 82
Export Inspections. . . . . . . . . . . . . . . . . . . . . . . . . . 83
Import Inspections. . . . . . . . . . . . . . . . . . . . . . . . . . 84
Mexican Cattle. . . . . . . . . . . . . . . . . . . . . . . . . . . . 85
American Veterinary Medical Association. . . . . . . . . . . . . . . 88
Quarantine Stations. . . . . . . . . . . . . . . . . . . . . . . . . 90
Car Inspection. . . . . . . . . . . . . . . . . . . . . . . . . . . . 91
Stock Yards. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 92
16. Report of the Pathologist, Charles H. Higgins, V.S., D.V.S. . . . . . . . 93
Anthrax. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 94
Tuberculosis. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 94
Tuberculin. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 95
Glanders. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 96
Mallein. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 97
Pictou Cattle Disease. . . . . . . . . . . . . . . . . . . . . . . . . 97
Hog Cholera. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 98
Cattle Ticks. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 99
Disinfectants. . . . . . . . . . . . . . . . . . . . . . . . . . . . . 99
Haemorrhagic Septicaemia. . . . . . . . . . . . . . . . . . . . . . . 99
Actinobacillosis. . . . . . . . . . . . . . . . . . . . . . . . . . . . 99
Laboratory Photography. . . . . . . . . . . . . . . . . . . . . . . . 100
Laboratory Records. . . . . . . . . . . . . . . . . . . . . . . . . . 100
Acetylene Gas and its adaptability for general use in Bacteriological Laboratories. . . . . . . . . . . . . . . . . . . . . . . . . . . . . 104
17. Report by A. E. Moore, D.V.S. . . . . . . . . . . . . . . . . . . . . . 107
Glanders. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 107
Tuberculosis. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 108
Hog Cholera. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 108
Suspected Hog Cholera. . . . . . . . . . . . . . . . . . . . . . . . 108

No. 17. Report by A. E. Moore, D.V.S.—*Concluded.*

PAGE.

Anthrax . . . . . . . . 108
Black-quarter . . . . . . . . 109
Sheep Scap . . . . . . . . 109
Mange in Horses . . . . . . . . 109
Typhoid Influenza . . . . . . . . 109
A Disease resembling Haemorrhagic Septicaemia in Cattle . . . . . . . . 109
Cracked Heels in Cows . . . . . . . . 109
Stock Yards . . . . . . . . 110
18. Report by Professor M. C. Baker, D.V.S., Montreal . . . . . . . . 110
19. " by Charles McEachran, D.V.S.,Montreal . . . . . . . . 111
20. " by B. A. Sugden, D.V.S., Montreal . . . . . . . . 112
21. " by J. H. Frink, V.S., St. John, N.B . . . . . . . . 113
22 " by Wm. Jakeman, D.V.S., Halifax, N.S . . . . . . . . 115
23. " by Andrew A. Leckie, M.R.C.V.S., Charlottetown, P.E.I . . . . . . . . 116
24. " by J. A. Couture, D.V.S., Quebec, P.Q . . . . . . . . 117
25. " by W. H. Pethick, Central Bedeque, P.E.I . . . . . . . . 116
26. " by George Townsend, V.S., New Glasgow, N.S . . . . . . . . 120
27. " by V. T. D'Aubigny, M.V., Terrebonne, Que . . . . . . . . 121
28. " by John D. Duchêne, D.V.S., Quebec, P.Q . . . . . . . . 121
29. " by Professor Andrew Smith, F.R.C.V.S., Toronto, Ont . . . . . . . . 122
30. " by T. E. Watson, V.S., Niagara Falls South, Ont . . . . . . . . 122
31. " by Geo. W. Orchard, V.S., Windsor, Ont . . . . . . . . 123
32. " by Arthur Brown, V.S., Sarnia, Ont . . . . . . . . 124
33. " by J. H. Tennent, V.S., London, Ont . . . . . . . . 124
34. " by Wm. Stubbs, V.S., Caledon, Ont . . . . . . . . 126
35. " by Geo. W. Higginson, V.S., Rockland, Ont . . . . . . . . 126
36. " by W. W. Stork, V.S., Brampton, Ont . . . . . . . . 127
37. " by M. B. Perdue, V.S., Chatham, Ont . . . . . . . . 128
38. " by Jos. Kime, Jr., V.S., Chatham, Ont . . . . . . . . 129
39. " by J. R. Thorne, V.S., Wallaceburg, Ont . . . . . . . . 130
40. " by George H. Belaire, V.S., Pembroke, Ont . . . . . . . . 130
41. " by Charles Little, V.S., Winnipeg, Man . . . . . . . . 131
42. " by P. A. Robinson, V.S., Emerson, Man . . . . . . . . 132
43. " by R. D. Scurfield, M.D.V., Crystal City, Man . . . . . . . . 133
44. " by W. Little, V.S., Boissevain, Man . . . . . . . . 133
45. " by R. E. Monteith, V.S., Killarney, Man . . . . . . . . 134
46. " by A. Bowen Perry, Commissioner N.W. Mounted Police, Regina, N.W.T . . . . . . . . 134
47. " by J. C. Hargrave, D.V.S., Medicine Hat, N.W.T . . . . . . . . 145
48. " by A. G. Hopkins, B. Agr., M.D.V., Vancouver, B.C . . . . . . . . 147
49. " by C. R. Richards, M.D.C., V.S., Victoria, B.C . . . . . . . . 148
50. " by J. A. Armstrong, V.S., Nelson, B.C . . . . . . . . 149
51. " by W. S. Bell, V.S., Cranbrook, B.C . . . . . . . . 150
52. " by Chas. W. Peterson, Inspector of Live Stock Cars and Yards west of Winnipeg, Calgary, N.W.T . . . . . . . . 150
53. " by F. Torrance, D.V.S., Winnipeg, Man . . . . . . . . 152
Bovine and Human Tuberculosis, by D. E. Salmon, D.V.M., Chief of the Bureau of Animal Industry, Washington, D.C., presented at the meeting of the American Veterinary Medical Association, Ottawa, Canada, September, 1903 . . . . . . . . 154
The Bang System for stamping out Tuberculosis in Cattle, by the Hon. W. C. Edwards . . . . . . . . 161

PAGE.

Anthrax and Black-leg, by Dr. Chas. H. Higgins, V.S., D.V.S., Pathologist. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 164
Foot and Mouth Disease. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 167

MISCELLANEOUS.

54. Report of the Fifth National Industrial Exhibition held at Osaka, Japan, from March 1 to July 31, 1903, by Wm. Hutchison, Exhibition Commissioner. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 172

APPENDIX TO THE REPORT OF THE MINISTER OF AGRICULTURE

# EXPERIMENTAL FARMS

## REPORTS

OF THE

| | |
|---|---|
| DIRECTOR - - - - - - - | WM. SAUNDERS, LL.D. |
| AGRICULTURIST - - - - - - | J. H. GRISDALE, B. AGR. |
| HORTICULTURIST - - - - - - - | W. T. MACOUN |
| CHEMIST - - - - - - - - | F. T. SHUTT, M.A. |
| ENTOMOLOGIST AND BOTANIST - - - - | JAS. FLETCHER, LL.D. |
| EXPERIMENTALIST - - - - - | C. E. SAUNDERS, B.A., PH. D. |
| POULTRY MANAGER - - - - - - | A. G. GILBERT |
| SUPT. EXPERIMENTAL FARM, NAPPAN, N.S. - | R. ROBERTSON |
| HORTICULTURIST " " " - - | W. S. BLAIR |
| SUPT. EXPERIMENTAL FARM, BRANDON, MAN. - | S. A. BEDFORD |
| " " " INDIAN HEAD, N.W.T. | ANGUS MACKAY |
| " " " AGASSIZ, B.C. - - | THOS. A. SHARPE |

FOR

## 1903

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1904

# APPENDIX

TO THE

# REPORT OF THE MINISTER OF AGRICULTURE

ON

# EXPERIMENTAL FARMS

---

OTTAWA, December 1, 1903.

SIR,—I beg to submit for your approval the seventeenth annual report of the work done, and in progress, at the several experimental farms.

In addition to my report, you will find appended, reports from the following officers of the Central Experimental Farm: From the Agriculturist, Mr. J. H. Grisdale; from the Horticulturist, Mr. W. T. Macoun; from the Chemist, Mr. Frank T. Shutt; from the Entomologist and Botanist, Dr. James Fletcher, and from the Experimentalist, Dr. C. E. Saunders. A report is also submitted from the Poultry Manager, Mr. A. G. Gilbert.

From the Branch Experimental Farms there are reports from Mr. R. Robertson, Superintendent, and from Mr. W. S. Blair, Horticulturist of the Experimental Farm for the Maritime Provinces, at Nappan, Nova Scotia; from Mr. S. A. Bedford, Superintendent of the Experimental Farm for Manitoba, at Brandon; from Mr. Angus Mackay, Superintendent of the Experimental Farm for the North-west Territories, at Indian Head, and from Mr. Thos. A. Sharpe, Superintendent of the Experimental Farm for British Columbia, at Agassiz.

In these reports there will be found the results of many important and carefully conducted experiments in agriculture, horticulture and arboriculture, the outcome of practical and scientific work in the fields, barns, dairy and poultry buildings, orchards and plantations at the several experimental farms; also of scientific research in the chemical laboratory bearing on many branches of agricultural and horticultural work, and of information gained from the careful study of the life histories and habits of injurious insects and the methods by which noxious weeds are propagated and spread, together with the most practical and economical measures for their destruction. In the report of the Entomologist and Botanist will also be found particulars of the experiments and observations which have been made during the past year in connection with the Apiary.

The large and constantly increasing demand by the farmers of the Dominion for the publications issued from the experimental farms, the rapidly extending correspondence and readiness shown by farmers everywhere to co-operate with the work of the farms in the testing of new and promising varieties of cereals furnish gratifying evidence of the desire for information and improvement among this class of the community, also of the high esteem in which the work of the farms is held. It is hoped that the facts brought together in the present issue will be found of much practical value to the Canadian farmer and fruit-grower and that they may assist in advancing agriculture and horticulture in this country.

I have the honour to be, sir,
Your obedient servant,

WM. SAUNDERS,
*Director of Experimental Farms.*

To the Honourable
The Minister of Agriculture,
Ottawa.

# ANNUAL REPORT

OF THE

# EXPERIMENTAL FARMS

## REPORT OF THE DIRECTOR, WM. SAUNDERS, LL.D., F.R.S.C., F.L.S.

The results of farm operations in Canada in 1903 have, on the whole, been encouraging. While the wheat crop in the Canadian North-west has been reduced in volume, and the grade somewhat lowered by unfavourable weather, the higher prices which have prevailed have done much to make up both for the shortage and the injury. In the eastern provinces the returns have been larger, and most of the more important crops have given more than an average, and in the output of live stock and dairy products the increase has been general. The area of land under crop is increasing rapidly and the volume of agricultural exports becoming larger from year to year.

During the past seven years the exports of farm products have more than doubled. The articles in which the larger part of this increase has occurred are wheat, flour, pease, cattle, pork, poultry, cheese, butter and fruits. Along these lines the resources of Canada for the extension of trade are practically unlimited. With suitable climates, an enormous area of fertile land and a body of intelligent farmers earnest in their desire to improve their condition, and with an aptitude for acquiring practical information in all lines of farm work we may safely look for continued advancement.

It should, however, never be forgotten that we shall always have much to learn; and a striving for improvement in quality of product, in methods to economize the cost of production and to increase the output should never cease. There are competitors on every hand, and the search for new outlets for Canadian products should ever continue and we should always be ready to do our best to meet the wants and wishes of those who are willing to trade with us.

Canada has for many years been making steady progress, but in no branch of work has this been so evident as in that great national industry, agriculture. The governments of this country have been liberal in their efforts to assist the farmers to a better knowledge of their business, and to-day, as a whole, no farmers are better informed than those in Canada, and the results of the efforts which have been made for the farmers' advancement have laid the foundations for a prosperous condition of agriculture of which as yet we see only the beginning.

The efforts which have been made in connection with the experimental farms in the past, to help farmers to solve some of the problems and to successfully meet the difficulties common to farming, have been much appreciated and the work of the past year, as recorded in the pages of this seventeenth annual report, will, it is believd, furnish additional facts of great value. New matter is presented from every department, and continued efforts have been made to give to all the information gained, an application, as practical as possible, looking always to the improvement of agriculture and the making of the noble work of the farm more attractive and profitable.

# THE LEADING CEREAL CROPS IN CANADA.

## OATS.

The oat crop is the most important of all cereal crops in the eastern provinces. In Ontario it occupies a larger area than all other cereals combined. While the area devoted to fall and spring wheats in this province is gradually lessening, the oat acreage is constantly going up. In Quebec, next to hay it is much the most important of all crops. The area in barley also in Ontario is steadily increasing. The explanation of this probably lies in the fact that these two cereals which were at one time largely exported but are now almost entirely consumed on the farm have been found most economical and suitable for the feeding of dairy cows and swine, and for the fattening of steers. In Manitoba also the acreage in oats is increasing. In 1903 it amounted to 855,431 acres, with a total yield of 33,035,774 bushels, an average of 38·62 bushels per acre. In all the other provinces and territories it is also an important crop.

The increase in the acreage of oats has been associated with a considerable increase in the average crop. For the 19 years from 1882 to 1901 the average crop of oats in Ontario was 34 bushels 27 pounds per acre, while the crop for the past two years has averaged 42 bushels 5 pounds per acre. This is an average increase of 7 bushels 12 pounds per acre, which estimated at the value of 1 cent per pound, has added nearly two million dollars a year to the profits of oat growing in this province. This is a very good showing. Comparing Ontario with the States which border on either side, we find that in the state of New York the average for the ten years ending in 1900 was 28 bushels 27 pounds per acre, and for 1902 and 1903 an average of 37 bushels. In Michigan the average for the ten years ending with 1900 was 29·7, and for 1902 and 1903 an average of 35·2. In Wisconsin the average for the ten years ending with 1900 was 32·9 and for 1902 and 1903, an average of 36·4. From these figures it will be seen that Ontario is well above its neighbours in the yield obtained from the land devoted to oats.

To gain information as to the most productive and profitable oats to grow, promising sorts have been brought together for test from all countries. About 60 varieties have been under trial during the past eight or nine years at each of the experimental farms, where they have been grown side by side under practically uniform conditions, and their relative earliness, productiveness and quality ascertained. From year to year the records of the results of this work are carefully gone over and any varieties which may have fallen for some years below a certain high standard of average productiveness are dropped from the list, thus bringing more prominently before the farmers of Canada those sorts which have been found to be most productive. The best of those on the list are grown in considerable quantities every year to supply the samples which are sent free to every farmer who applies.

At the experimental farms larger crops have been grown than the average reached by the several provinces.

At the Central Farm, at Ottawa, the average yield of all the varieties tested in 1903 on the experimental plots was 62 bushels 9 pounds, and the best twelve sorts gave an average of 73 bushels 6 pounds per acre; on a field of 39 acres of Banner oats 57 bushels 9 pounds per acre were obtained.

At the Nappan Experimental Farm, in Nova Scotia, the average yield of all the varieties tested on experimental plots was 81 bushels 18 pounds per acre, and that of the best twelve varieties 94 bushels 27 pounds. The field crops on that farm have run from 65 to 70 bushels per acre.

At the experimental farm at Brandon, Manitoba, the average yield on experimental plots of all the varieties tried was 97 bushels 4 pounds per acre, and that of the best twelve varieties 110 bushels 28 pounds. In field crops the yields have varied from 73 bushels 18 pounds to 86 bushels 18 pounds per acre.

At the experimental farm at Indian Head, North-west Territories, the average of all the varieties on experimental plots was 117 bushel 23 pounds and that of the best twelve sorts 128 bushels 26 pounds per acre.

In field crops, 5 acres of Banner gave an average of 119 bushels 2 pounds per acre, and 3 acres of Abundance, an average of 106 bushels. The other varieties under field culture varied from 98 bushels 14 pounds to 82 bushels 3 pounds per acre. Taking into account the whole of the field crops (36 acres) the average yield has been 95 bushels 8 pounds per acre.

At the experimental farm at Agassiz, British Columbia, the average crop of all the varieties tested in experimental plots was 66 bushels 4 pounds per acre, and that of the best twelve sorts 77 bushels 12 pounds per acre.

Among the varieties which have given the heaviest crops are the Banner, Wide Awake, Improved Ligowo, Abundance, Tartar King, Waverley and Thousand Dollar and provision has been made to give these varieties a wide distribution during the coming season.

The Banner oat is a variety which has done remarkably well. During the past nine years it has given an average on the experimental plots on all the farms of 78 bushels 25 pounds per acre and in all the field crops at all the farms during the same period an average of 71 bushels 10 pounds per acre.

The Banner oat is also attracting attention in Great Britain. In 1899, in response to a request from Prof. Patrick Wright, Principal of the Agricultural College of Glasgow, samples of some of the best sorts of oats cultivated in Canada were sent to him from the experimental farm to be grown for comparison with the best sorts cultivated in Scotland. Prof. Wright's reports show that from the outset the Banner oat took a leading position among the many varieties he was growing, and the next year a request came from him for twelve bushels for further trial, and in the year following for fifty bushels more. These were distributed among a number of leading farmers in different parts of Scotland, and the reports published were so favourable that a great demand was created for the seed and several large orders were received by seed firms in Canada last year for these oats for use in Great Britain. In a recent letter from Prof. Wright, he says: 'It may interest you to know that the Banner oat has now taken an assured position among the oats cultivated in Britain, and has proved itself to be equal to, if not better, than any other oat we have.'

Another of the varieties sent to Scotland from here is also attracting notice. This is the 'Wide-awake.' Of this variety in a recent letter Prof. Wright speaks as follows: 'In our last season's trials a remarkably good result is shown in our tables by the 'Wide-awake' oat of which we also got the original seed from you. It has done so well that I am writing you now to ask if you would be good enough to get sent to me without delay twenty quarters (160 bushels) to be used as seed this season.' I succeeded in getting fifty bushels, which were sent in good time for sowing. In a letter of March 17, he says: 'If this oat does as well with us next year as last, it is also likely with the Banner, to pass into general cultivation here.' It is gratifying to know that we are thus helping farmers in the mother country with Canadian varieties of a very productive and valuable character.

In estimating the value of an oat the relative weight of kernel and hull must be considered. This will vary with the variety and with the weight per bushel of the sample. The lighter the weight per bushel the larger is the proportion of hull. In a very light sample, weighing about 20 pounds to the bushel, the proportion of hull has been found to be over 50 per cent, whereas the same variety of the standard weight (34 pounds per bushel) would only have about 30 per cent of hull.

The Banner is generally regarded as a thick-hulled oat, but in our experience it is only medium in this respect. In the following table the varieties which were most largely distributed from the Central Experimental Farm in 1903, are referred to, and their place of growth, weight per bushel and proportion of hull given. The Tartar

King, Waverley and Goldfinder are varieties recently introduced by Garton Bros., England:—

| Name of Variety. | Where grown. | Weight per Bushel. | Proportion of Hull. |
|---|---|---|---|
| | | Lbs. | Per cent. |
| Banner | Ottawa | 42½ | 28·6 |
| " | Indian Head | 44½ | 29·7 |
| Improved Ligowo | Ottawa | 41½ | 26·6 |
| " | Indian Head | 46½ | 26 |
| Wide Awake | " | 46½ | 28 |
| Tartar King * | Ottawa | 37½ | 34·3 |
| " | Indian Head | 46¾ | 28 |
| " | As imported from England. | 39½ | 30·9 |
| Waverley | Ottawa | 41 | 26·3 |
| " | Indian Head | 46½ | 26·7 |
| Goldfinder | Ottawa | 39 | 28·6 |
| " | Indian Head | 42 | 28·1 |
| " | As imported | 35 | 24·9 |

In some instances there seems a tendency to produce a somewhat thicker hull in this country; in others a thinner one. Investigations have not yet gone far enough along this line to permit of any decided opinion on this subject. One point which our examinations seem to prove is this: that as a rule the actual weight of hull in a given number of kernels of any one variety of oats is practically the same, whether the oat weigh 30 or 40 pounds per bushel, and the difference in weight is made up in the size of the kernel. This, after all, is not a matter of much surprise, when we look carefully into the subject. When an oat during its growth heads out, the husk is of full size, and the framework for holding the kernel is all there. The covering for the future oat is fully developed, the flower is produced in the cavity prepared for it, fertilization takes place, followed by the growth to maturity of the kernel. The plumper the kernel, the heavier is the oat.

### ANALYSIS OF HULLS AND KERNELS.

What gives to this subject the greatest importance is the fact that the hull contains a very small proportion of nutritive matter. The quantity of albuminoids or flesh-forming constituents and of fat in oat hulls is not much more than half of what is found in oat straw. Oat hulls, according to Henry, contain 3·3 per cent of total albuminoids. Mr. Shutt, the Chemist of the experimental farms, finds this to be only 2·6 per cent in Canadian oats, while in oat straw the average of six analyses gives 4·1, and for the kernel of the oat, 14·51, showing the immense difference in feeding value between the husk or hull and the kernel, and pointing to the importance of growing the plumpest and most productive sorts. The proportion of fat in the hull is relatively less. While the kernels contain 6·24 per cent of fat and the oat straw 2·1 per cent, the proportion of fat, as given by Henry, is 1 per cent in the hull, and by Shutt, ·78 per cent (a trifle over ¾ of 1 per cent). I append the results of Mr. Shutt's analysis, which is of the Banner oat grown in Ottawa in 1902.

---

* The Tartar King has a stiff straw and evidently has a larger proportion of hull than most other oats which we have tested.

CROP OF 1902, C.E.F.

*Proportion of kernels to hulls:*

| | |
|---|---|
| Kernels | 71·92 |
| Hulls | 28·08 |
| | 100·00 |

| — | Moisture. | Albuminoids. | Fat. | Carbohydrates. | Fibre. | Ash. |
|---|---|---|---|---|---|---|
| Oats (whole grain) | 12·74 | 11·22 | 4·82 | 58·84 | 9·47 | 2·91 |
| Kernels | 12·03 | 14·51 | 6·24 | 63·15 | 1·93 | 2·14 |
| Hulls | 10·19 | 2·60 | 0·78 | 49·63 | 31·63 | 5·17 |

From the facts submitted it will be seen that heavy oats are worth a higher price than light oats, as in buying them the purchaser gets a larger proportion of the highly nutritious kernels. The kernel contains nearly six times as much albuminoids as the hulls and eight times as much fat. It will also be noted that judging from the crops produced at the experimental farms a further increase in the average yield of oats per acre in the provinces and territories may be looked for when the conditions involved in the production of good crops are more carefully and fully complied with.

## WHEAT.

While the oat is so highly important among the crops in the east, wheat holds a corresponding position of importance in the west, where much the larger area is occupied by this crop.

The wheats grown throughout the world consist mainly of five different species and their varieties. *Triticum vulgare,* in which are included most of the spring and winter wheats cultivated in America, Great Britain, in many of the European countries, and in Australia, for the making of bread. *Triticum durum,* a class of wheats which are hard and rice-like, represented in this country by such varieties as Goose wheat, Kubanka, Gharnovka, Velvet Don and others. These are valuable wheats for macaroni and pastry, and are used in some countries for bread. Large quantities of these wheats are grown in Southern Europe, and recently they have been introduced into some of the western United States, where they have been grown with some success. They have also been tested in Canada. They are less liable to rust than other wheats, but their cultivation has been discouraged by millers, on the ground that they are of inferior quality and unsuitable for bread-making.

A third species is known as *Triticum polonicum* or Polish wheat, which produces large kernels and large loose heads. The grain is hard and flinty, resembling in this respect the macaroni wheats.

The fourth group of wheats are known as Emmers *Triticum dicoccum* and the fifth as Spelts *Triticum spelta.* These five groups include all the varieties grown.

The origin of the wheat plant is unknown. There does not appear to be any reliable records of any of the varieties having been found growing in a wild state, but some of them have been in cultivation since very early times. The earliest mention of wheat in the Bible is in Genesis, chap. 30, v. 14. The Spelt wheats were grown by the ancient Egyptians and are still much cultivated in some of the mountain districts in Europe. The importance of the wheat crop may be gathered from the quantity produced and consumed in the world. It is certainly the most important of all the world's crops and the most valuable to mankind of all cereals. The total crop for the entire world in 1903 is given as 3,258,688,000 bushels.

The season of 1903 has not been quite so favourable to the farmers of Manitoba and the North-west Territories as those of the past two years. In 1903 the total area of wheat sown in Manitoba was 2,442,873 acres, which returned a crop of 40,116,878 bushels, the average yield being 16·42 bushels per acre. This is 12,960,389 bushels less than was produced in 1902. In the North-west Territories the acreage under wheat was 837,234, and the average crop, 19 bushels, representing a total output of 16,029,149 bushels. This added to the crop of Manitoba, makes a total wheat crop for 1903 of 56,146,027 bushels, a decrease in wheat yield, when compared with the crop of 1902, of 10,888,090.

In Ontario the land devoted to winter wheat in 1903 was 665,028 acres, which produced a total crop of 17,787,169 bushels, being an average of 26·7 bushels per acre. Spring wheat occupied 248,518 acres which produced 4,797,274 bushels, an average of 19·3 bushels per acre. Total area in wheat in Ontario, 913,576 acres, total crop, 22,584,443 bushels. The wheat crop in Quebec, the Maritime provinces and British Columbia, although growing in volume, occupies as yet only a small proportion of the acreage under cultivation.

The higher prices realized this season for wheat have done much to make up for a shortage in yield, and a larger area of land than ever before has been prepared for the crop of the coming year.

While the eastern provinces will probably always have surplus wheat to export, it is to the north-west country we must look for the greater volume of exports of this valued cereal, since the area suitable for wheat culture there is enormous, and owing to advantages in soil and climate the wheat grown there is of higher quality and commands a higher price than that grown in the east.

### SOME OF CANADA'S VAST AREAS OF FARM LANDS.

The area of land suitable for the growing of agricultural crops in Canada is so vast that when presented in figures the mind needs much training before their full significance can be grasped. The civilized world is gradually awakening to a somewhat hazy perception of the immense wealth laid up in the many millions of acres of fertile lands unoccupied here and large numbers of immigrants are flocking to our shores. The great North-west country is a huge field for future enterprise, as yet very imperfectly understood even among our own people.

The following figures as to the quantity of land fit for settlement in the province of Manitoba and the three provisional territories, Assiniboia, Saskatchewan and Alberta, have been obtained from official sources and may be accepted as approximately correct for the areas in question:—

| — | Total Area exclusive of Water. | Estimated Proportion suitable for Cultivation. | |
|---|---|---|---|
| | Acres. | | Acres. |
| Manitoba | 41,000,000 | Two-third equal to | 27,000,000 |
| Assiniboia | 57,000,000 | Seven-eighths " | 50,000,000 |
| Saskatchewan | 70,000,000 | Three-fourths " | 52,000,000 |
| Alberta | 64,000,000 | Two-thirds " | 42,000,000 |
| | | Total | 171,000,000 |

It is thus estimated that there are within the limits referred to, after making allowance for lands unfit for agriculture, about 171 million acres suitable for cultivation, by which is meant land of such a degree of fertility as to admit of profitable farming. While referring here only to the possibilities of agricultural progress within this area, where the quality of the soil and the conditions of climate are fairly well known, we should not deal justly were we to pass over the great north country lying beyond the boundaries of Saskatchewan and Alberta without a few words of explanation.

The 155 million acres of land in Athabaska, and the 340 million acres in Mackenzie, will no doubt prove important factors in the future development of Canada; but what proportion of these vast districts will be capable of the profitable growing of crops is as yet a matter of conjecture. There are, however, some proofs available showing that it is possible to grow cereals to some extent in portions of these remote districts of which our knowledge is so fragmentary.

The writer has received samples grown at Dunvegan, on the Peace river, in Athabaska, 414 miles by latitude north of Winnipeg, of Ladoga wheat plump and well matured, weighing 64 pounds per bushel. From Fort Vermillion, further down the Peace river, also in Athabaska, 591 miles north of Winnipeg, Ladoga wheat has been raised weighing 60 pounds per bushel.

Considerable quantities of wheat have of late been grown by settlers in the Peace river valley, especially near Vermillion, where there is said to be a considerable area of land suitable for wheat growing. The Hudson's Bay Company have built a good roller mill at Vermillion, with a capacity of twenty barrels of flour per day, and have paid $1.50 per bushel for all the wheat grown in that vicinity this year. This has been done with the hope of being able to supply their northern posts with flour from this district. The quantity of wheat grown there this year is estimated at 7,500 bushels. One of the settlers, Mr. F. S. Lawrence, of Vermillion, claims to have had this season about 40 bushels per acre from 50 acres of his wheat land.*

From Fort Simpson, in Mackenzie, 818 miles north of Winnipeg, by latitude, Ladoga wheat has been obtained which weighed 62½ pounds per bushel. In this instance a small percentage of the grain was injured by frost. This is the furthest point north from which samples of wheat have been received. The time between sowing and harvesting in these far northern districts is in some instances less than it is at the experimental farm at Ottawa. At Dunvegan the wheat was sown May 7, and harvested August 21, giving a growing period of 101 days. The same sort of wheat grown at Ottawa, taking the average of three years, requires 106 days. At Fort Vermillion the time between sowing and harvesting was also 101 days, and at Fort Simpson the wheat was sown June 7, and harvested September 22, giving a growing period of 107 days.

The long days are an important factor in bringing about this result, the influence of increased periods of light hastens the ripening of cereals very much. This view is supported by facts brought together during a careful series of observations made some years ago by a distinguished Russian investigator, Kowalewski. He experimented with spring wheat and oats, growing them in different parts of Russia, from the far north, at Arkangelsk to the southern province of Kherson. He found that in the higher latitudes the grain ripens in a shorter period than in the more southern districts, the difference varying at different points from 12 to 35 days. This author attributes the earlier ripening in the north largely to the influence of light during the long summer days. He also believes that the short seasons of quick growth have gradually brought about in these cereals an early ripening habit. In our experience with early ripening cereals, this habit is a permanent characteristic which they continue to manifest when grown in localities where the summer season is longer.

Returning again to the smaller and better known districts, Manitoba and the three provisional territories in which are included the 171 million acres which are said to be suitable for cultivation, we find that a very small proportion of this land less than four per cent, has yet been brought under crop. It does not follow that all the land fit for settlement within the area referred to is suitable for wheat growing. There are some localities where the season is too short to make wheat a sure crop and farmers in such districts will find it more profitable to carry on mixed farming; but from the good crops which have been harvested during some years past in most of the settled or partly settled regions, within this area, it is evident that the greater part of the country is well suited for the growing of wheat of high quality.

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* I am indebted to Mr. J. M. Macoun, of the Geological and Natural History Survey, who has recently returned from exploring parts of the Peace river valley, for these items of information.

Another consideration which would reduce the area annually available for wheat is that the land, to get the best results, should be summer-fallowed every third season. Further, while many excellent farmers advocate the growing of two crops of wheat in succession, one on fallowed land, the second on stubble, to be followed by fallow, it may be found more profitable in some localities to grow wheat in rotation with other crops.

Making allowances for all these requirements, the fact still remains, that the resources of Canada in wheat lands are enormous.

The total wheat crop of the United States for 1903 was 637,821,835 bushels, sufficient to feed a population of about 80 millions and leave a margin of about 235 million bushels for export. This wheat was all grown on less than 50 million acres of land. Furthermore the yield per acre of wheat in Canada is larger than it is in the United States. In 1902 and 1903 the average crop given for the whole of the United States, including winter and spring wheat, is about 14 bushels per acre. That this yield for the past two years is not abnormal is shown by the fact that the average for the past ten years has been 13·53 bushels per acre.

Ontario and Manitoba are the only two provinces for which statistics are available for these periods. In 1902 and 1903 the average crop of winter wheat in Ontario was 26·4 bushels, and of spring wheat 19·3 bushels per acre, and for the same years in Manitoba where only spring wheat is grown an average of 21·21 bushels.

The average of a ten years' record tells much the same story. The average yield of winter wheat in Ontario for the past ten years was 21·52 bushels per acre, and of spring wheat 16·64 bushels. In Manitoba the average for the past ten years has been a little over 20 bushels per acre. Comparing this with the states bordering on Manitoba we find that the average yield per acre of wheat in Minnesota for the past ten years has been 14·33 bushels, in North Dakota 12·87 bushels and in South Dakota 10·67 bushels per acre. This larger yield in Canada is no doubt partly due to the land being more productive and partly to a more favourable climate, and in some measure to better farming. Were one-fourth of the 171 million acres said to be suitable for cultivation in Manitoba and the three provisional territories under crop with wheat annually, and the average production equal to that of Manitoba for the past ten years, the total crop would be 855 million bushels annually, which would place Canada in the position of being much the largest wheat producing country in the world. These figures deal only with a portion of the west, and do not take into account the wheat-growing areas in the large eastern provinces.

Under the climatic conditions which prevail in the Canadian North-west, wheat of excellent quality is grown, which is much sought after by millers to mix with the flour of wheat of lower grades, so that a desirable and uniform strength may be maintained in the flour they produce. This strength in flour, which is so highly developed in that made from No. 1 Hard wheat grown in the North-west, is due to the presence of a large proportion of gluten of high quality. The relative proportions of the more important constituents in wheat will depend on the character and tendencies of the individual variety, the climatic conditions under which it is grown, and the fertility of the soil. The chief constituents of wheat are gluten, starch and fat, all highly nutritious in their character. Starch forms the larger portion of the substance of the grain, ranging in spring wheat from 65 to 68 per cent; gluten from 11 to about 15; and fat from about 1¾ to 2¼ per cent. Winter wheat contains a larger proportion of starch, from 70 to 74 per cent, and a smaller proportion of gluten, from 6 to 9 per cent. The proportion of fat is much the same in both classes of wheat. When a number of different sorts of wheat are grown side by side and under the same conditions, some will be found to contain a larger proportion of gluten, others a more abundant deposit of starch. In the better sorts of spring wheat, when grown in northern latitudes, where the summer season is short and the growth rapid, the proportion of gluten is usually increased and under such conditions the grain improves in quality. The gluten exists in the kernel in the form of an irregular frame-work, which extends throughout the substance of the grain, firmly packed with clusters of starch granules. The frame-work of glutinous matter is formed in the early stages of the growth of the berry, and the starch granules are subsequently deposited in the interspaces. In the preparation of flour the berry is crushed, the exterior is separated as bran or shorts, while the interior contents form the fine flour for bread-making. The starch in flour may be separated from the gluten by the simple process of washing with water, whereby the starch granules are removed and the gluten remains as a sticky mass. By working this with the fingers under a gentle stream of water, the starch may be entirely removed and the proportion of moist gluten determined. The starch contains no nitrogen, but the gluten is highly nitrogenous and a most excellent nutrient and flesh-former.

Chemical analyses of gluten have shown that it consists of two different principles, known as gliadin and glutenin, and it is from the combination of these in the best proportion that the highest quality of gluten results. Hence, while the percentage of gluten may be regarded in a general way as indicating the quality of a wheat, a high percentage of this substance is not always a sure indication of the milling value of the sample. Both the percentage and quality must be had to produce a flour which will give to bread made from it that tenacity which results in a light, porous white loaf of the most highly esteemed character. The best spring wheats grown in the Canadian North-west are noted for the high quality of gluten they contain and hence are in great demand.

### REVIEW OF THE WORK WITH WHEAT AT THE EXPERIMENTAL FARMS.

At the experimental farms persistent efforts have been made from the outset to bring together from different countries the best and most promising sorts of wheat for trial, the qualities particularly sought being productiveness, earliness, and strength of flour. These varieties have been grown side by side, under similar conditions, so that their relative value might be determined.

Among the spring wheats commonly grown at the time the farms were established none was so highly or justly esteemed as the Red Fife, and the position it still holds is a pre-eminent one. It is remarkable for its productiveness, for its high quality, and for its power of adapting itself to varying conditions of soil and climate. This wheat originated about sixty years ago, as a chance discovery with Mr. David Fife, of Otonabee, Ontario, and hence has been in cultivation for more than half a century, and it does not show any tendency to deterioration. It gives as large a crop and is as high in quality as it ever was. It was taken from Ontario to Manitoba and the North-west Territories, where it is believed to have improved in quality, and as grown there, stands probably higher in the estimation of millers for the making of flour than any other known variety.

To preserve Red Fife in a state of purity by hand-picking in the field, has been one of the lines of work carried on persistently at the experimental farms.

While the Red Fife has so many points of excellence, it is open to one objection, which sometimes proves a very serious drawback to its cultivation. It is rather late in ripening and during the past fifteen or twenty years there have been several seasons when early frosts in the North-west have injured the grain so as to reduce its value very materially. Whenever this has occurred an outcry has been made by the farmers who have suffered, for an earlier ripening wheat.

In the endeavour to meet this demand varieties of wheat have been brought to Canada from many different countries, and grown for many years at all the experimental farms, alongside of the Red Fife and other well known sorts and their periods of ripening and weight of crop carefully recorded. Some wheats have been brought from the colder districts in Northern Russia, verging on the Arctic circle, some from other countries in the northern parts of Europe, others from different altitudes in the Himalaya mountains, in India, from 500 to as high as 11,000 feet, which is about the limit for wheat-growing in that range. Other wheats have been obtained in the northern United States, from Australia, Japan and elsewhere.

Both the Russian and Indian wheats have usually ripened earlier than the Red Fife, but some have been inferior in quality, and others have given such small crops that the growing of most of them has been abandoned. Those we have had from Australia, also those from the North-western States, have been as late as, and many of them later than the Red Fife, and show no advantages over that variety. Every promising sort obtainable has been tested under the different climatic conditions existing in Canada, without finding a single earlier-ripening sort in cultivation elsewhere having the high quality and productiveness of the Red Fife.

### THE BREEDING OF NEW WHEATS.

Another method by which we have sought to obtain the desired end has been by the cross-breeding of wheats, with the object of combining the good qualities of two or more varieties. It was on July 19, 1888, when the first experiments were begun in the cross-breeding of wheat on the experimental farm and since that time several hundred new sorts have been produced and tested. In originating many of these new productions the Red Fife has been chosen as one of the parents. One of the earlier importations from Northern Russia was the Ladoga, a wheat which after a thorough test proved on an average to be about a week earlier in ripening than the Red Fife; it was also fairly productive, but the colour of the flour made from it was not so white as that made from the Red Fife. It has, however, served a good purpose in the far northern districts, where its earliness of ripening has commended it to the settlers. The slightly yellow colour of the flour, which was the chief objection to its use here, was no drawback to it there, since it makes excellent bread. Samples of this Russian importation were early sent from the experimental farm to settlers in the Peace river district, and the Ladoga is said to be the only variety of wheat now grown in all that country. A considerable number of crosses were also produced between Ladoga and Red Fife, the most promising of which were multiplied until plots of considerable size could be grown. These were subject to rigid inspection from year to year, the less desirable sorts being promptly discarded, so as to keep the number of varieties under trial within reasonable bounds.

Among the most promising of the numerous progeny from this parentage are the varieties known as Preston and Stanley. The Preston is a bearded sort. The Stanley is beardless. Taking the average yield obtained on the experimental plots on all the experimental farms for a period of nine years, the Preston has given a crop of 34 bushels 41 pounds per acre, while the Red Fife has given 33 bushels 7 pounds per acre, a difference of 1 bushel 34 pounds in favour of the Preston. The Preston has also ripened uniformly earlier, the gain in time of ripening averaging from four to six days.

The Stanley is a twin wheat with the Preston, both having had origin in the one kernel. The plant grown from the cross-bred kernel the first season produced heads which were uniformly bearded; but when the seed from this was sown the year following, some plants produced bearded heads and others beardless. Subsequently these two varieties were bred to type by discarding all the variations produced until the types became fixed. Stanley, during a nine years' test, has given an average crop of 32 bushels 2 pounds per acre, which is 1 bushel 5 pounds less than Red Fife for the same period. In earliness of ripening this variety is about the same as the Preston.

The White Fife, which has averaged 8 pounds per acre more than Red Fife, during a nine years' trial, is grown to a considerable extent in some parts of Manitoba and the North-west Territories; but, although highly esteemed by some, it is not held to be equal in quality to the Red Fife. This variety was also crossed with the Ladoga and the best results obtained were Huron and Percy. Huron is a bearded variety which has also proven productive and early. During a nine years' test it has given a slightly larger crop than Red Fife, exceeding that variety by 4 pounds per acre. It has also matured from four to five days earlier. Percy has given an average crop during the nine years' trial of 31 bushels 30 pounds per acre, which is 1 bushel 37 pounds per acre less than Red Fife for the same time. This also ripens earlier than Red Fife by from four to five days.

Another variety, known as Early Riga, was obtained by crossing one of the East Indian wheats, named Gehun, brought from a high elevation in the Himalayas, 11,000 feet, with a Russian wheat known as Onega. The Onega was brought from near Archangel, one of the most northerly wheat growing districts in Russia. These were both early varieties, but were not very productive. The Early Riga was the best sort produced from this cross and has proved to be one of the earliest ripening wheats known. During the five years it has been under trial it has ripened on an average from eight to nine days earlier than Red Fife. It is also fairly productive, having given an average crop for five years at all the experimental farms of 31 bushels 2 pounds per acre, being 2 bushels 5 pounds less than Red Fife for the same.

## MILLING TESTS OF WHEAT.

The next point to consider is the quality of these cross-bred wheats and how they compare with Red Fife. To gain information on this point, three lots of samples were put up, consisting of two of Red Fife carefully cleaned and of the very best quality, with two each of Preston, Stanley and Percy. One of these was grown at Ottawa, Ont.; the other at Indian Head, N.W.T. One lot of samples was submitted to Mr. Julicher, the well known wheat expert of the Pillsbury-Washburn Flour Mills Co., of Minneapolis, Minn. A second lot was sent to Lord Strathcona, High Commissioner for Canada, London, England, with a request that they be submitted to one of the best English wheat experts. The third lot was handed to the Chemist of the experimental farms, Mr. F. T. Shutt, for analysis.

I am much indebted to Mr. L. P. Hubbard, of the Pillsbury-Washburn Flour Mills Company, Limited, for the privilege of sending samples of Canadian wheats to be tested by their expert, Mr. J. H. Julicher. The samples sent were all forwarded under numbers, and no information was given as to the varieties submitted. In presenting Mr. Julicher's report, I have placed the names of the wheats after the numbers under which the samples were forwarded, so that the readers of the report may know to which they refer.

| — | Dough. | | Gluten. | | Quantity. | Quality. |
|---|---|---|---|---|---|---|
| | Quality. | Action in Washing. | Density. | Colour. | | |
| | | | | | p.c. | |
| No. 7 (Red Fife, Ottawa).......... | White.... | Excellent. | Excellent. | White........ | 11·8 | 101 |
| " 3 (Red Fife, Indian Head).... | White.... | Excellent. | Excellent. | White........ | 11·9 | 101 |
| " 6 (Preston, Ottawa)........... | Creamy .. | Good..... | Good..... | Creamy white. | 11·9 | 100 |
| " 2 (Preston, Indian Head)..... | Yellow... | Good..... | Good..... | Creamy ..... | 11·9 | 100 |
| " 8 (Stanley, Ottawa). .......... | Creamy .. | Good..... | Good..... | Creamy white. | 12·9 | 100 |
| " 4 (Stanley, Indian Head)..... | Yellow... | Good..... | Good..... | Creamy ...... | 12·4 | 100 |
| " 5 (Percy, Ottawa) .......... | Yellow... | Good..... | Fair ..... | Creamy ...... | 13·3 | 100 |
| " 1 (Percy, Indian Head)....... | Yellow... | Good..... | Good..... | Creamy ...... | 12·4 | 100 |

The samples marked 1 (Percy), 2 (Preston, I.H.) and 4 (Stanley, I.H.) are good wheats, but the others are better. I would favour 3 (Red Fife, I.H.) and 7 (Red Fife, Ottawa). In my opinion 3, 7 and 8 (the two Red Fifes and Stanley, Ottawa) would be excellent for milling, and bread made from flour of these would be very hard to match for quality, colour and strength.

J. H. JULICHER.

March 24, 1903.

These were all classed, as to condition, as very dry.

By reference to the table, it will be seen that the Red Fife from Indian Head and the Red Fife grown at Ottawa are graded exactly in the same terms, which was a matter of surprise to me as I had understood that the Red Fife grown in the east was not equal in quality to that grown in the north-west. I am told, however, that the season of 1902 was somewhat exceptional in that respect, and that the difference in quality between Red Fife grown in the west and that grown in the east was less that year than usual, the conditions having been such as to give to eastern samples a relatively higher quality.

While the dough of the flour of the Red Fife was pronounced white, and the gluten white and excellent, that from the Preston from Ottawa was rated as creamy and good, with good creamy white gluten. The dough from the Preston from Indian Head is said to be yellow and good, and the gluten as good and creamy, indicating a slightly better quality in the Ottawa-grown sample.

Mr. Julicher says that the samples marked '1,' Percy, and '2,' Preston, Indian Head, and '4,' Stanley, are good wheats, but others are better. He states that he would favour '3,' that is Red Fife, Indian Head, and '7,' Red Fife, Ottawa, and he says, 'In my opinion "3," "7" and "8"'—which are the two Fifes and the Stanley at Ottawa—'would be excellent for milling and bread made from the flour of these would be very hard to match for colour, quality and strength.' The Stanley, which he puts with the Red Fifes, is a twin wheat with the Preston. It is graded by Mr. Julicher as a trifle better than Preston, although he pronounces them all to be good wheats.

## REPORT OF AN ENGLISH EXPERT.

The samples sent to Lord Strathcona were submitted by him to Mr. William Halliwell. In a letter received from his Lordship he says: 'I now forward you the report of Mr. William Halliwell on the eight samples of wheat which you sent me. Mr. Halliwell is the technical editor of *The Miller*. He is lecturer on flour milling to the London County Council, registered teacher of milling technology at the city and Guilds Institute, and may therefore, I think, be regarded as a competent authority. He has, moreover, had twenty-five years' experience of practical flour milling and wheat buying.

'I also inclose for your information a copy of the letter Mr. Halliwell wrote when sending me his report.'

Mr. Halliwell writes as follows:—

'ROOKWOOD, ROMFORD, May 22, 1903.

'W. L. GRIFFITH, ESQ.,

'DEAR SIR,—I beg to forward you the result of my examination of the eight samples of Canadian wheat you were good enough to send me some days ago.

'I have given them special attention from a practical miller's point of view, and I hope you will find the results to be of benefit to Canadian wheat-growers generally. There is an unlimited market for the best sorts of wheat in this country and when my report is published I hope proper emphasis will be laid upon this point. Pure high-class samples will be preferred to those from any other source, as these wheats from the Canadian North-west are constantly growing in favour with the millers of this country.

'Yours faithfully,

(Signed) WILLIAM HALLIWELL.

In the letter to Lord Strathcona which accompanied the samples an item of information was given as to where these samples had been grown. I told him that samples one to four were from the North-west Territories and that samples five to eight were the same wheats grown in eastern Canada.

Mr. Halliwell's report is as follows:—

'Critical examination of eight samples of Canadian wheat:

'For strength, as viewed from the outside, from cutting the grains, and from reducing them to powder, I find they come out as follows: The samples are numbered 1 to 8. Four of them (1 to 4) are from Indian Head Farm and are called regular samples of No. 1 wheat. The other four (5 to 8) are from the Government Experimental farm at Ottawa. One to four are almost equal and may be classed as their numbers indicate, there being a just perceptible difference—but not enough I should say, to make a difference in the general selling price on our English markets. Following these I put the experimental samples (from Ottawa) in the following order, namely: 6, 5, 8, 7, and I might add that their general excellence is much better than one would expect to find from their outside appearance alone. In no case, however, would the latter numbers be sold for the price of those numbered 1 to 4. In making this statement, I am bearing in mind that the chief ingredient required in Canadian wheat is gluten or strength, given that the nature of the wheat also guarantees a maximum of the other attributes which millers expect to find and do find in well developed Canadian grown grain. Speaking as a miller, I also am of opinion that the Indian Head samples (1 to 4) will yield more middlings, of larger and more even size, and of better shape and all round quality than those grown on the experimental farm at Ottawa. There would also be less break flour—a thing all millers try to avoid making, seeing that this quality of breaking flour is only akin to the lowest grade. I may explain this more clearly by saying that the object of all millers is to make middlings first and flour afterwards. Middlings can be purified and so prepared for conversion into the highest grades of patent flour, whereas if the structure of the wheat does not lend itself quite so readily to this performance, but is apt to be too easily disintegrated on the break rolls, the result means flour, and that of a much lower quality, seeing that it cannot be sent to the purifiers at all, therefore I say that according to my judgment, the break flour would be less in the first four samples. Going a step farther, I am of the opinion that the middlings made from the Indian Head samples would grade better—would be more even in size, in texture and in gravity. These are the three primary considerations which govern the successful milling operations, and they are ever present when buying high class wheat for milling purposes. Wheat particles—middlings—which grade well, are always found in the largest quantity at the head of the mill, where the highest priced patent flour is made. The wheats from the experimental farm at Ottawa do not, in my opinion, possess all these qualifications in the highest degree. They are not quite so compact in their structure, or in other words, they are of a slightly more mellow nature and are rather more inclined to break up more quickly, and also into more sizes, smaller sizes in fact, and thus there would be a tendency towards them being conveyed lower down the milling system before being converted into flour. This, of course, means that the larger percentage would be graded as second patents. To my mind, it appears as if the Indian Head wheats were grown under the better natural conditions and in quite different soil.'

'In the simple matter of flour yield, however, the Ottawa wheats are undoubtedly first, but, as I may be permitted to remark, mere flour yield is not the sole consideration regarding the buying of Canadian wheats. What we require first of all is strength, and given this, yield and colour follow as a natural consequence. When examining the various samples as intended for the purifiers, I still pin my faith to the Indian Head samples. They—as broken up by the millers break rolls—are more free from bran snips, more free from adhering bits of the branny coating, and are thus more easily operated upon, giving to the purifiers a slightly larger constant capacity, and, as I have already pointed out, this capacity is needed on account of the larger quantity of middlings made, yet at the same time, it is the highest recommendation because this larger quantity is to be made into patent or high class flour. Having been through the purifiers, the more compact middlings (Indian Head samples again) go straight to the reduction rolls, and are immediately reduced to flour, whereas whenever there is the slightest mellowness—or weakness I may call it—the flour does not get to the sack quite so quickly. Strictly, however, it is a question of strength, pure and simple, and I have endeavoured to point out my conclusions on that head particularly. Whichever wheat is strongest will get to the flour sack quickest. Patent flour is made where the strength is supposed to be, and when buying strong wheat, millers look to the points I have enumerated.

‘I have also compared the eight samples with others on the London Corn Exchange at the present time (May 21). I have been at the trouble to work them side by side in the examination just given, and I find that for strength (the ruling characteristic) Nos. 1, 3 and 4 would sell off Mark Lane stands at 34s. 3d. per 496 pounds; No. 2, 34s.; Nos. 5 and 7 at 33s. 9d., and Nos. 6 and 8 at 33s. 6d. A comparison with Canadian shippers' figures may be interesting. This will be best made by those more intimately interested.

‘In order to put my meaning in concise form I append a small table of the various constituents compared with what I find already on the English Exchange.

Colour Marks.

| Numbers. | | | | | | | | English Sample. | Maximum Price. | Maximum Marks. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | | | |
| | | | | | | | | | s. d. | |
| 10 | 9 | 10 | 10 | 9 | 10 | 9 | 10 | 9 | 34 3 | 10 |

Strength.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 9 | 10 | 10 | 9 | 8 | 8 | 8 | 9 | ............ | 10 |

Appearance.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 10 | 10 | 10 | 8 | 8 | 8 | 8 | 8 | ............ | 10 |

Milling Structure.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 10 | 10 | 10 | 9 | 9 | 8 | 9 | 9 | ............ | 10 |

‘In conclusion, I should just like to add that not nearly enough of the first quality reaches our principal markets. This may of course arise from the fact that most of it is milled in Canada. Our regular samples do not on the whole reach up to the maximum, but may be said to be a shade better than what I found when I mixed several together. It would also be to the general advantage if the grades were kept more distinct and a stricter line drawn between the best No. 1 sorts and No. 1 ordinary. The best is always welcome, will always fetch the highest price, while mixing of any kind whatsoever spoils them for one or other of the points I have just enumerated.

(Signed ‘William Halliwell.’

Mr. Halliwell says that samples Nos. 1 to 4, inclusive, that is Red Fife, Preston, Stanley and Percy, grown at Indian Head, are almost equal, ‘There being a just perceptible difference, but not enough, I should say, to make a difference in the general selling price on our English markets.’ The four samples of the same wheats grown at Ottawa he ranks somewhat lower in value, but says that their general excellence is much better than one would expect from their outside appearance alone. In no case, however, would the latter numbers be sold at the price of those numbered 1 to 4. He puts these Ottawa grown samples in the following order of merit:—'6' Preston, '5' Percy, '8' Stanley, '7' Red Fife.

Further on in his report he seems to reach a slightly different conclusion and alters the relative position of these numbers, when he comes to speak of the price they would bring that day on the London market. He says: 'I have also compared the eight samples with others on the London Corn Exchange, May 21. I have been at the trouble to work them side by side in the examination, and I find that for strength (the ruling characteristic) Nos. "1," Percy, "3," Red Fife, and "4," Stanley, would sell at Mark Lane at 34s. 3d. per 496 pounds; No. "2," at 34s.; Nos. "5," Percy, and "7," Red Fife, at 33s. 9d., and Nos. "6," Preston, and "8," Stanley, at 33s. 6d.

The results of these tests and criticisms show that the two cross-bred wheats, Percy and Stanley from Indian Head are, in the opinion of Mr. Halliwell, in every respect equal to Red Fife, taking into account colour, strength, appearance and milling structure. The Preston stands equal to Red Fife in appearance and milling structure, but falls slightly below in point of strength. In the first part of his report Mr. Halliwell speaks of this as a 'just perceptible difference, not enough, I should say, to make a difference in the general selling price on our English markets.' But when dealing with the actual values of the samples on the London Corn Exchange, Percy, Stanley and Red Fife are given as being worth 34s. 3d. for 496 pounds, and Preston as worth 34s., which is equivalent to a difference in value of ¾ of one cent per bushel.

Again, in his valuation of the samples grown at Ottawa, he puts the Percy and Red Fife first, instead of putting the Preston first, as in the early part of his report, placing these at 1½ cents a bushel less in value, and Preston and Stanley at 2¼ cents less per bushel in value than the same wheats grown in the North-west. These estimates of the relative value of these wheats in the London market, coming from so high an authority and a man of so much experience, are, no doubt in every way worthy of confidence. The differences, however, in actual value are less than one would suppose, judging from the relative prices of eastern and western wheats in this country.

## ANALYSES OF WHEATS BY THE CHEMIST OF THE EXPERIMENTAL FARMS.

The analyses made of the eight wheats referred to, by Mr. F. T. Shutt, Chemist of the Dominion Experimental Farms, were reported on as follows:—

'CENTRAL EXPERIMENTAL FARM,
OTTAWA, May 2, 1903.

'Report on Wheats—Percy, Preston, Red Fife, and Stanley—Grown on the Experimental Farm, Indian Head, N.W.T., and the Central Experimental Farm, Ottawa, 1902.

| Number. | Variety. | Locality Grown. | Weight per bushel. | Weight of 100 kernels. | Moisture. | Albuminoids. | Fat. | Crude Fibre. | Ash. | Carbo-hydrates. | Gluten. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Wet. | Dry. |
| | | | Lbs. | Grams. | | | | | | | | |
| 1 | Percy .... | Indian Head..... | 62 | 2·828 | 11·50 | 12·50 | 2·26 | 1·79 | 1·47 | 70·48 | 38·10 | 14·78 |
| 2 | Preston..... | " ..... | 63½ | 3·022 | 11·48 | 11·63 | 2·25 | 1·85 | 1·68 | 71·11 | 31·68 | 12·34 |
| 3 | Red Fife ... | " ..... | 62½ | 3·164 | 11·44 | 12·44 | 2·48 | 1·86 | 1·36 | 70·42 | 34·68 | 13·43 |
| 4 | Stanley .... | " ..... | 62½ | 3·019 | 11·08 | 12·41 | 2·42 | 1·88 | 1·44 | 70·77 | 37·48 | 14·18 |
| 5 | Percy ...... | Ottawa ........ | 62 | 3·551 | 12·05 | 13·56 | 2·14 | 2·09 | 1·91 | 68·25 | 41·59 | 16·64 |
| 6 | Preston.... | " ........... | 63 | 3·680 | 12·22 | 12·22 | 2·46 | 1·83 | 1·88 | 69·39 | 35·93 | 14·26 |
| 7 | Red Fife ... | " ..... | 61 | 3·302 | 12·79 | 12·41 | 2·43 | 2·02 | 1·84 | 68·51 | 34·35 | 13·55 |
| 8 | Stanley .... | " ........... | 62 | 3·551 | 12·23 | 12·34 | 2·44 | 2·08 | 1·71 | 69·20 | 33·95 | 14·22 |

'These wheats have been submitted to a careful chemical analysis, which included a determination of all the important constituents. The results are given in the accompanying table, which also presents certain data of a physical character, usually taken into consideration in determining the relative values of wheats.

'In certain important features, well marked differences are to be observed between the wheats grown at Indian Head and Ottawa. These may be briefly alluded to as follows:—

'Moisture: Invariably, the Indian Head wheats have the smaller water-content. Their average is 11·37 per cent, while that of the Ottawa grown samples is 12·40 per cent.

'Albuminoids: As the analyses stand, two varieties—Percy and Preston—as grown at Ottawa, show a somewhat higher proportion of albuminoids than the same wheats grown at Indian Head; in the case of the other two, Red Fife and Stanley—the percentages of this constituent, as obtained from the Ottawa grown samples, do not materially differ from those of Indian Head. The average obtained from the four varieties at Indian Head is 12·24 per cent, and of the same wheats, grown at Ottawa, is 12·64 per cent.

'It has already been remarked that the Ottawa grown wheats contain the larger percentage of moisture; it is, therefore, evident that calculated to a water-free basis, they would all show a higher percentage of albuminoids than those from Indian Head.

'Gluten—Wet and Dry: Though intimately allied to the albuminoids present these results being obtained by mechanical means, do not furnish as accurate a guide to the nutritive values of the wheats as those obtained by chemical analysis. It is of interest and importance, however, to note that they follow closely the albuminoid content, and thus furnish corroborative data as to the greater value, both from the milling and nutritive standpoint, of the Ottawa grown wheats. The analyses are as follows:—

'Ottawa Samples: Wet gluten, 36·45 per cent; dry gluten, 14·67 per cent.

'Indian Head Samples: Wet gluten, 35·48 per cent; dry gluten, 13·68 per cent.*

'The foregoing results as to albuminoids and gluten are not such as we should have predicted. Our own investigations in the past have almost invariably indicated that wheats grown in the North-west are richer in this respect than the same varieties grown in Ontario or the eastern provinces, and our results in this matter have received corroboration from those of Professor Richardson, late of the Division of Chemistry, Department of Agriculture, Washington, D.C., U.S., who some years ago made a very thorough investigation into the character of wheats as grown in the several States of the Union, and who was successful in showing that environment—soil, climate, and cultivation—had a great effect upon the composition of wheats. Wheat, of all the cereals, is the most susceptible to the influences of environment, and consequently we may well suppose as a result of an unfavourable season a wheat decidedly inferior to that usually obtained in the locality. These considerations lead the writer to conclude that the present data are somewhat abnormal, and are not to be interpreted as indicating that the environment as at Ottawa is invariably more favourable to a high protein-content than that of the North-west. The probability is that the seasonal or climatic influences last autumn at Indian Head, and probably other parts of the North-west, were not so favourable to the maturation of the grain as usual.†

'Oil or Fat: The data showing the percentage of this constituent do not call for any special or detailed comment. The average for the Indian Head samples is 2·35 per cent; that for the Ottawa samples, 2·37 per cent.

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*In comparing these gluten data with those obtained by the miller, the former will invariably be found higher, since they have been obtained upon the whole wheat meal, and consequently contain the elements of the bran and shorts absent in the flour.

† In discussing these conclusions with an experienced grain buyer and miller, I am informed that the wheat of last year's crop from certain districts of the North-west is somewhat inferior in quality to that usually produced, and that this may be attributed to a check in the ripening of the wheat, which occurred a few weeks before harvesting, due to low temperatures; in some parts the freezing point was almost reached.

'Crude Fibre: This constituent practically represents the bran elements. The Ottawa grown wheats show a somewhat higher proportion, but the difference is slight. The averages are: Indian Head, 1·84 per cent; Ottawa, 2·01 per cent.

'Ash: As regards mineral matter, the Ottawa grown wheats show slightly higher percentages than those from Indian Head. The average for the former is 1·83 per cent; for the latter, 1·49 per cent. This may be an additional indication of the more complete ripeness of the Ottawa grown samples.

'In making a comparison between the varieties, judging of excellence chiefly from the albuminoids and gluten content, it is first to be noted that all these wheats are of the same general character, in many particulars almost identical, and would be designated as of first class quality. The amount and character of the gluten indicate clearly their high value for bread making purposes. There are, however, certain differences, and if placed in order of merit, Wheat No. 5, Percy, Ottawa, would stand first, with the same wheat grown at Indian Head (No. 1) a close second. Of the other three wheats, those grown at Indian Head, the order would probably be Red Fife and Stanley, equal, followed closely by Preston. In the Ottawa grown samples these three wheats show extremely small differences—the albuminoid data slighly favouring the Red Fife, while the dry gluten content similarly favour the Preston and Stanley.

(Sgd.) 'FRANK T. SHUTT,
*'Chemist, Dominion Experimental Farms.'*

### FURTHER MILLING TESTS AND ANALYSES.

A second lot of samples was sent to Mr. Julicher, of Minneapolis, numbering six in all, two of White Fife, one of which was from Ottawa and one from Indian Head; one of Early Riga grown at Indian Head, this being the very early ripening wheat to which I have already referred, a cross of Onega with Gehun, another was a sample of Laurel from Ottawa, a cross between Red Fife and Gehun, and two samples of Goose wheat, one from Ottawa and one from Indian Head. The Laurel was sent because it had given an average yield of 33 pounds per acre in excess of Preston on a four years' test, and 2 bushels 16 pounds per acre more than Red Fife.

Mr. Julicher's report on this second lot of samples is as follows:—

MINNEAPOLIS, Minn., April 6, 1903.

| | Dough. | | Gluten. | | | |
|---|---|---|---|---|---|---|
| | Quality. | Action in Washing. | Density. | Colour. | Quantity. | Quality. |
| | | | p.c. | | | |
| No. 9 (White Fife, Ottawa) .... | Creamy white. | Excellent. | Excellent. | White.... | 11·8 | 101 |
| " 12 (White Fife, Indian Head) . | Creamy ..... | Good.... | Good.... | Creamy .. | 11·1 | 100 |
| " 14 (Early Riga, Ottawa) ...... | Creamy white. | Excellent. | Excellent. | White... | 14·2 | 101 |
| " 11 (Laurel, Ottawa)..... .. .. | Creamy white. | Good..... | Good..... | White.... | 11·1 | 100 |
| " 10 (Goose, Ottawa) ........... | Dark. ........ | Poor ..... | Ductile... | Dark..... | 11·4 | 90 |
| " 13 (Goose, Indian Head)...... | Dark yellow.. | Poor ..... | Ductile... | Yellow . . | 12·8 | 95 |

The samples marked 9 (White Fife, Ottawa) and 14. (Early Riga) are of excellent quality; Nos. 11 (Laurel, Ottawa) and 12 (White Fife, Indian Head) are of good quality; but Nos. 10 (Goose, from Ottawa) and 13 (Goose from Indian Head) are of very poor quality for milling and bread making; of these two I would favour Nos.13 (the Indian Head sample).

In this examination, Mr. Julicher puts the Early Riga in point of quality, higher than either of the samples of Red Fife, except that he makes the dough creamy white instead of white. He says it is excellent in the dough, excellent in the density of the gluten, white in colour of gluten, 101 in quality of gluten, and 14·2 per cent in quantity. This gives it about 20 per cent more gluten than the sample of Red Fife from Indian Head. Here then we have a wheat which is eight and a half days earlier and higher in quality than Red Fife. It is possible that the season of 1902 may have been specially favourable to the Early Riga, but it is scarcely possible that any difference in season favourable to the production of a high proportion of gluten in the Early Riga would at the same time be unfavourable to the gluten content of Red Fife. This result as to the quality in Early Riga is most encouraging, and a gain of eight and a half days in ripening is of the greatest importance, as it may permit of the extension of the area for successful wheat growing a considerable distance northward.

A sample of the Early Riga wheat was also sent to Mr. F. T. Shutt, Chemist Dominion Experimental Farms, for analysis, on which he reports as follows:

'CENTRAL EXPERIMENTAL FARM,
'OTTAWA, May 14, 1903.

'Report on Early Riga wheat, grown at Experimental Farm, Indian Head, N.W.T., 1902.

'*Analysis.*

| | |
|---|---|
| Moisture | 11·09 |
| Albuminoids | 13·72 |
| Fat | 2·13 |
| Crude fibre | 1·90 |
| Ash | 1·40 |
| Carbo-hydrates | 69·76 |
| | 100·00 |

'*Physical Data.*

| | |
|---|---|
| Weight per bushel | 64 lbs. |
| Weight of 100 kernels | 2·438 grams. |
| Wet gluten | 44·07 |
| Dry gluten | 16·70 |

'Comparing these results with those of the eight samples reported on May 2, 1903, it will be noted:

'1. That as regards moisture-content this wheat is very similar to those from Indian Head already examined. Their average was 11·37 per cent as against 11·09 per cent in the present instance.

'2. That in albuminoids this wheat is slightly superior to the best of the series previously reported on, viz., the Percy. The figures are as follows:—

| | |
|---|---|
| Early Riga (N.W.T.) | 13·72 |
| Percy (Ottawa) | 13·56 |
| Percy (N.W.T.) | 12·50 |

'As might be expected, the data for the wet and dry gluten are similarly higher than those of the Percy.

| | Wet Gluten. | Dry Gluten. |
|---|---|---|
| Early Riga (N.W.T.) | 44·07 | 16·70 |
| Percy (Ottawa) | 41·59 | 16·64 |
| Percy (N.W.T.) | 38·10 | 14·78 |

'Not only is the gluten satisfactory as to quantity, but also as to quality. In noting the character of the wet gluten, it was found to be slightly creamy in colour, firm, elastic, and of uniform texture—denoting a 'strong' flour and one eminently suitable for bread making purposes.

'FRANK T. SHUTT,
'*Chemist, Dominion Experimental Farms.*'

Mr. Shutt does not find in the chemical analysis quite as large a difference in the proportion of gluten in the Early Riga, when compared with the Percy, as Mr. Julicher gives, but the difference is only a fraction of one per cent. It should be noticed here that Mr. Shutt in each instance has analysed the whole wheat finely ground whereas Mr. Julicher's examinations were of the flour only.

### DEDUCTIONS FROM ANALYSES OF WHEATS.

From the facts submitted, it seems clear that the eight samples first sent to these experts, of Red Fife, Preston, Percy and Stanley, whether grown at Indian Head or Ottawa, are all good wheats for milling and for bread. Mr. Julicher puts the two Red Fife samples first, very closely followed by Stanley, which is a twin wheat with Preston, and contains a higher percentage of gluten than either of the Red Fife samples. Preston stands equal to Red Fife in proportion of gluten, but drops below it a little in point of colour of the dough, the Ottawa sample of Preston standing a little higher in that respect than that from Indian Head in Mr. Julicher's report.

From the chemical analyses of these samples, Mr. Shutt puts Percy first in point of merit. It is shown to be richest in gluten, which accords also with Mr. Julicher's statement, whilst Mr. Halliwell puts it as just equal with Red Fife. Between Preston and Red Fife, while the Red Fife is graded as higher in quality, the difference is small and the advantage the Preston has of ripening on a average fully four days earlier may possibly make up for any slight difference in the grade. Its earlier ripening habit is a great inducement to the farmer to put this variety in as part of his crop, provided he can get about the same price for it. A difference of two-thirds of a cent per bushel, the actual difference in value on the English market, according to Mr. Halliwell, would not weigh with the farmer to any appreciable extent.

If a settler has a large acreage of wheat and has only limited help he must begin cutting part of the crop before it is quite ready or his wheat will shell badly before he reaches the end of his harvesting. The part of the crop which is cut first will shrivel more or less, which involves a loss in weight and sometimes in grade, to which must be added such loss as may arise from shelling. If by having a portion of the crop of an earlier sort, these difficulties can be overcome and there will be a large gain in the quality and character of the wheat grown.

With reference to the high quality and early maturing habit of the Early Riga wheat, the information presented is most encouraging. If this wheat on further trial maintains its earliness, quality and productiveness, its general introduction may largely infuence the future of wheat-growing in Canada. The outlook is most encouraging, and the result a triumph of the skill of the hybridizer.

The few varieties here referred to constitute only a small proportion of the new sorts which have been produced. There are on hand many others of more or less promise which have been several years under trial. These with a considerable number of varieties of more recent production demand more care and attention than it has been possible for the Director to give them.

In view of the great importance of this branch of the work at the experimental farms, and to provide for its continuance in a larger way, the Minister of Agriculture has authorized the formation of a special division of cereal breeding and experimentation, in charge of an officer known as the experimentalist, who will devote his whole time to it. The first report of the experimentalist will be found in this Annual Report of the Experimental Farms.

## SPECIAL EXPERIMENTS WITH FERTILIZERS.

In the annual report of the experimental farms for 1893, details were given on pages 8 to 24 of the results of a series of tests which were carried on during the previous five or six years with the object of gaining information regarding the effects which follow the application of certain fertilizers and combinations of fertilizers on the more important farm crops. The particulars there given covered the results of six years' experience with crops of wheat and Indian corn, and five years' experience with crops of oats, barley, turnips and mangels. The results of similar tests conducted for three years with carrots and one year with sugar beets were also given.

These experiments have been continued, and a summary of the results obtained has been given each year, taking the average yield of crops from the beginning, adding the results for the current year, and then giving the average yield for the full time. These tests were undertaken on virgin soil, on a piece of land which was cleared for the purpose. For particulars regarding the clearing and preparing of the land for crop in 1887-88 and its subsequent treatment the reader is referred to the earlier issues of this report.

### OBJECT IN VIEW IN CONDUCTING THESE EXPERIMENTS.

In establishing and conducting this series of experiments, the object in view has been to gain information as to the effects produced by certain fertilizers and combinations of fertilizers on particular crops. They were never intended to serve as model test plots such as farmers could copy with advantage in their general practice. On the contrary, to gain the information desired, it has been found necessary to use some fertilizers in unusual quantities, and in other instances to more or less exhaust the soil by a succession of crops of the same sort, practices which in ordinary farming would be extravagant or detrimental. From this long conducted series of tests much useful information has been gained, which appeals to the mind with greater force as experience accumulates from year to year.

### VALUABLE INFORMATION GAINED.

These trials have shown that barn-yard manure can be most economically used in the fresh or unrotted condition; that fresh manure is equal, ton for ton, in crop-producing power to rotted manure, which, other experiments have shown, loses during the process of rotting about 60 per cent of its weight. In view of the vast importance of making the best possible use of barn-yard manure, it is difficult to estimate the value of this one item of information.

When these experiments were planned, the opinion was very generally held that untreated mineral phosphate, if very finely ground, was a valuable fertilizer, which gradually gave up its phosphoric acid for the promotion of plant growth. Ten years' experience has shown that mineral phosphate, untreated, is of no value as a fertilizer.

The use of sulphate of iron, which at the time these tests were begun, was highly recommended, as a means of producing increased crops, has also been proven to be almost useless for this purpose.

Common salt, which has long had a reputation with many farmers for its value as a fertilizer for barley, while others disbelieved in its efficacy, has been shown to be a most valuable agent for producing an increased crop of that grain, while it is of much less use when applied to crops of spring wheat or oats. Land plaster or gypsum has also proven to be of some value as a fertilizer for barley, while of very little service for wheat or oats. Some light has also been thrown on the relative usefulness of single and combined fertilizers.

### CHANGES MADE IN THE EXPERIMENTS.

After ten years' experience had demonstrated that finely-ground, untreated mineral phosphate was of no value as a fertilizer, its use was discontinued in 1898. Prior to this it had been used in each set of plots in Nos. 4, 5, 6, 7 and 8, in all the different series of plots, excepting roots. In 1898 and 1899, similar weights of the Thomas' phosphate were used in place of the mineral phosphate, excepting in plot 6 in each series. In this plot the Thomas' phosphate was used in 1898 only.

After constant cropping for ten or eleven years, it was found that the soil on those plots to which no barn-yard manure had been applied was much depleted of humus, and hence its power of holding moisture had been lessened, and the conditions for plant growth, apart from the question of plant food, had on this account become less favourable. In 1899 the experiments were modified and an effort made to restore some proportion of the humus and at the same time gain further information as to the value of clover as a collector of plant food. In the spring of that year ten pounds of red clover seed per acre was sown with the grain on all the plots of wheat, barley and oats. The clover seed germinated well, and after the grain was cut the young clover plants made rapid growth, and by the middle of October there was a thick mat of foliage varying in height and density on the different plots, which was ploughed under. The growing of carrots and potatoes on one-half of the cereal plots has been discontinued since 1898, and each plot of the wheat, barley and oats has occupied the full tenth of an acre.

In 1900, 1901, 1902 and 1903 clover was again sown on all the grain plots, and was ploughed under in October. In 1900 and 1901 a good growth of clover was obtained, but in 1902 a severe frost in the spring destroyed a large proportion of the young plants so that the crop available for ploughing under in the autumn was very light. In 1903 the crop of clover ploughed under in the autumn was fairly good.

### APPLICATION OF FERTILIZERS DISCONTINUED.

Another direction in which information was sought was in reference to the length of time which a liberal application of barn-yard manure would continue to affect subsequent crops, and in 1899 on plots 1, 2 and 6 the barn-yard manure, which had been used for ten or eleven years in succession, was discontinued. The phosphate fertilizer was also omitted on plot 6 in each series.

In 1900 all the fertilizers on all the plots were discontinued, and since then the same crops have been grown on all these plots from year to year without fertilizers, sowing clover with the grain each season. In this way some information has been gained as to the value of clover as a collector of plant food, and also as to the unexhausted values of the different fertilizers which have been used on these plots since the experiments were begun.

### SPECIAL TREATMENT OF PLOTS OF INDIAN CORN AND ROOTS.

As it was not practicable to sow clover with the Indian corn and root crops, the sowing of these latter crops was discontinued in the spring of 1900 and clover sown in their place in the proportion of 12 pounds per acre. The clover on these plots made strong growth, so strong as to necessitate twice cutting during the season, the cut clover being left on the ground in each case to decay and add to the fertility of the soil. The clover was left over for further growth in the spring of 1901, and ploughed under for the roots about May 10, and for corn about the middle of that month. Then roots and Indian corn were again sown. In 1902 crops of Indian corn and roots were grown on these plots, but in 1903 the land was again devoted to clover.

## WHEAT PLOTS.

The seed sown on each of these plots from the beginning has been in the proportion of 1½ bushels per acre, excepting in 1894; and the varieties used were as follows:—In 1888-89-90 and 1891, White Russian, and in 1892-3, Campbell's White Chaff. In 1894, the Rio Grande wheat was used, when, owing to lack of germinating power in the seed, a larger quantity was required. From 1895 to 1903 inclusive Red Fife wheat was used in the usual quantity of 1½ bushels per acre. In 1903, the Red Fife was sown April 22, and was ripe August 20.

### EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{10}$TH ACRE EACH.

| No. of Plot. | Fertilizers applied each year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn. | Average Yield for Fifteen Years. | | | 16th Season, 1903, Variety Red Fife. | | | Average Yield for Sixteen Years. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Yield of Grain. | | Yield of Straw. | Yield of Grain. | | Yield of Straw. | Yield of Grain. | | Yield of Straw. |
| | | Per acre. | | Per acre | Per acre. | | Per acre | Per acre. | | Per acre |
| | | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. |
| 1 | Barn-yard manure (mixed horse and cow manure) well rotted, 12 tons per acre in 1888; 15 tons per acre each year after to 1898 inclusive. No manure has been applied since then.... | 22 | $22\frac{10}{15}$ | 4,053 | 22 | 40 | 3,550 | 22 | $23\frac{12}{16}$ | 4,022 |
| 2 | Barn-yard manure (mixed horse and cow manure) fresh, 12 tons per acre in 1888; 15 tons per acre each year after to 1898 inclusive. No manure has been applied since then.... | 22 | $44\frac{9}{15}$ | 4,083 | 21 | 10 | 3,600 | 22 | $38\frac{11}{16}$ | 4,053 |
| 3 | Unmanured from the beginning.... | 11 | 26 | 1,957 | 14 | 30 | 2,300 | 11 | $37\frac{8}{16}$ | 1,978 |
| 4 | Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899 a similar weight of the Thomas' Phosphate was used. No fertilizers have been applied since then.... | 11 | 51 | 2,094 | 15 | 20 | 2,300 | 12 | $4\frac{1}{16}$ | 2,107 |
| 5 | Mineral phosphate, untreated, finely ground, 500 lbs. nitrate of soda, 200 lbs. per acre used each year from 1888 to 1897 inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.... | 12 | 43 | 2,824 | 16 | 50 | 2,000 | 12 | $58\frac{7}{16}$ | 2,773 |
| 6 | Barn-yard manure, partly rotted and actively fermenting, six tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897 inclusive. In 1898, 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then. | 19 | $28\frac{8}{15}$ | 3,354 | 17 | 50 | 2,755 | 19 | $22\frac{6}{16}$ | 3,317 |
| 7 | Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.... | 13 | $20\frac{1}{15}$ | 2,336 | 18 | 10 | 2,170 | 13 | $38\frac{3}{16}$ | 2,607 |

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF WHEAT $\frac{1}{10}$TH ACRE EACH—*Concluded.*

| No. of Plot. | Fertilizers applied each year from 1888 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn. | Average Yield for Fifteen Years. | | 16th Season, 1903. Variety, Red Fife. | | Average Yield for Sixteen Years. | |
|---|---|---|---|---|---|---|---|
| | | Yield of Grain. | Yield of Straw. | Yield of Grain. | Yield of Straw. | Yield of Grain. | Yield of Straw. |
| | | Per acre. | Per acre | Per acre. | Per acre | Per acre. | Per acre |
| | | Bush. lbs. | Lbs. | Bush. lbs. | Lbs. | Bush. lbs. | Lbs. |
| 8 | Mineral phosphate, untreated, finely ground, 500 lbs. wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then .. .... | 11 $23\frac{3}{15}$ | 2,195 | 14 25 | 2,560 | 11 $34\frac{9}{16}$ | 2,218 |
| 9 | Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then...... ... .................. | 12 $13\frac{13}{15}$ | 1,965 | 14 35 | 2,305 | 12 $22\frac{11}{16}$ | 1,986 |
| 10 | Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 13 $8\frac{10}{15}$ | 2,951 | 15 15 | 2,985 | 13 $27\frac{4}{16}$ | 2,953 |
| 11 | Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897 inclusive. No fertilizers have been applied since then...... ..... | 14 25 | 2,909 | 14 20 | 2,765 | 14 $24\frac{11}{16}$ | 2,900 |
| 12 | Unmanured from the beginning........... | 10 $25\frac{5}{15}$ | 1,940 | 12 10 | 1,985 | 10 $31\frac{14}{16}$ | 1,943 |
| 13 | Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 12 $33\frac{3}{15}$ | 2,056 | 14 55 | 2,805 | 12 $42\frac{1}{16}$ | 2,103 |
| 14 | Bone, finely ground, 500 lbs.; wood ashes unleached, 1,500 lbs. per acre; used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 15 20 | 2,648 | 17 10 | 3,180 | 15 $26\frac{14}{16}$ | 2,681 |
| 15 | Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 14 1 | 2,462 | 17 45 | 3,010 | 14 15 | 2,496 |
| 16 | Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 15 $44\frac{8}{15}$ | 2,240 | 15 35 | 2,925 | 15 $43\frac{15}{16}$ | 2,282 |
| 17 | Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 12 $57\frac{9}{15}$ | 2,403 | 14 10 | 2,870 | 13 $1\frac{11}{16}$ | 2,432 |
| 18 | Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 12 $51\frac{5}{15}$ | 2,007 | 12 45 | 2,297 | 12 $50\frac{13}{16}$ | 2,010 |
| 19 | Common salt (Sodium chloride), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then .......................... | 13 $51\frac{4}{15}$ | 1,640 | 12 50 | 2,069 | 13 $47\frac{7}{16}$ | 1,667 |
| 20 | Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then... ..... .......... | 12 $50\frac{8}{15}$ | 1,977 | 13 45 | 2,173 | 12 $53\frac{15}{16}$ | 1,989 |
| 21 | Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been used since then .................. .......... | 13 $10\frac{9}{15}$ | 1,969 | 14 45 | 2,208 | 13 $16\frac{8}{16}$ | 1,934 |

## BARLEY PLOTS.

The quantity of seed sown per acre on the barley plots was 2 bushels in 1889, 1890 and 1891. 1½ bushels in 1892 and 1893, and 2 bushels from 1894 to 1903, inclusive. Two-rowed barley has been used for seed throughout until 1902, when Mensury, a six-rowed sort was tried. The varieties used were as follows: 1889, 1890 and 1891, Saale; 1892, Goldthorpe; 1893, Duck-bill; and in 1894. 1895, 1896, 1897, 1898, 1899, 1900 and 1901, Canadian Thorpe, a selected form of the Duck-bill. In 1902 and 1903 Mensury was sown. In 1903 it was sown April 22, and was harvested on July 28.

### EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY, $\frac{1}{10}$TH ACRE EACH.

| No. of Plot. | Fertilizers applied each year from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn. | Average Yield for Fourteen Years. | | | 15th Season, 1903. Variety, Mensury. | | | Average Yield for Fifteen Years. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Yield of Grain. | | Yield of Straw. | Yield of Grain. | | Yield of Straw. | Yield of Grain. | | Yield of Straw. |
| | | Per acre. | | Per acre | Per acre. | | Per acre | Per acre. | | Per acre |
| | | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. |
| 1 | Barn-yard manure, well rotted, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then...... | 35 | $5\frac{2}{14}$ | 3,086 | 41 | 22 | 2,695 | 35 | $25\frac{7}{15}$ | 3,060 |
| 2 | Barn-yard manure, fresh, 15 tons per acre, each year to 1898, inclusive. No manure has been applied since then........ .... | 35 | $8\frac{7}{14}$ | 3,253 | 37 | 9 | 2,975 | 35 | $14\frac{14}{15}$ | 3,234 |
| 3 | Unmanured from the beginning..... ...... | 13 | $43\frac{7}{14}$ | 1,543 | 23 | 36 | 1,451 | 14 | $28\frac{13}{15}$ | 1,537 |
| 4 | Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used, no fertilizers have been applied since then.................. . .... . | 15 | $12\frac{10}{14}$ | 1,505 | 25 | 10 | 1,579 | 15 | $44\frac{8}{15}$ | 1,510 |
| 5 | Mineral phosphate, untreated, finely ground, 500 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then........... | 20 | $47\frac{4}{14}$ | 2,220 | 24 | 18 | 2,214 | 21 | $10\frac{2}{15}$ | 2,219 |
| 6 | Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre composted together, intimately mixed and allowed to heat for several days before using. applied each year from 1888 to 1897, inclusive. In 1898 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then .. .. ......... ... ...... | 28 | $15\frac{11}{14}$ | 2,403 | 31 | 37 | 2,293 | 28 | $26\frac{2}{15}$ | 2,396 |
| 7 | Mineral phosphate, untreated, finely ground. 500 lbs., nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then .... .... ........... | 25 | $46\frac{4}{14}$ | 2,380 | 30 | 25 | 2,335 | 26 | $12\frac{13}{15}$ | 2,377 |

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF BARLEY $\frac{1}{10}$ ACRE EACH—*Concluded.*

| No. of plot. | Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn. | Average Yield for Fourteen Years. | | | 15th Season, 1903, Variety, Mensury. | | | Average Yield for Fifteen Years. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Yield of Grain. | | Yield of Straw. | Yield of Grain. | | Yield of Straw. | Yield of Grain. | | Yield of Straw. |
| | | Per acre. | | Per acre | Per acre. | | Per acre | Per acre. | | Per acre |
| | | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. |
| 8 | Mineral phosphate, untreated, finely ground, 500 lbs., wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then............ | 21 | $3\frac{1}{14}$ | 1,821 | 31 | 32 | 2,032 | 21 | 37 | 1,835 |
| 9 | Mineral superphosphate, No. 1, 500 lbs. per acre used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then..... ............. .... | 21 | $8\frac{11}{14}$ | 1,757 | 26 | 32 | 1,333 | 21 | $26\frac{5}{15}$ | 1,729 |
| 10 | Mineral superphosphate, No. 1, 350 lbs., nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then...... .. .................... | 28 | $3\frac{2}{14}$ | 2,369 | 28 | 16 | 2,219 | 28 | 4 | 2,359 |
| 11 | Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.. | 26 | $39\frac{12}{14}$ | 2,488 | 29 | 38 | 2,377 | 27 | $1\frac{5}{15}$ | 2,481 |
| 12 | Unmanured from the beginning........... | 13 | $32\frac{1}{14}$ | 1,224 | 22 | 24 | 1,290 | 14 | $12\frac{5}{15}$ | 1,228 |
| 13 | Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 14 | $34\frac{11}{14}$ | 1,415 | 23 | 26 | 1,505 | 15 | 15 | 1,421 |
| 14 | Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 23 | $41\frac{10}{14}$ | 2,074 | 26 | 12 | 2,292 | 24 | $1\frac{5}{15}$ | 2,089 |
| 15 | Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 22 | $10\frac{6}{14}$ | 2,284 | 21 | 17 | 2,084 | 22 | $7\frac{10}{15}$ | 2,270 |
| 16 | Muriate of potash, 150 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 22 | $41\frac{2}{14}$ | 1,861 | 22 | 34 | 1,825 | 22 | $40\frac{10}{15}$ | 1,859 |
| 17 | Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 19 | $15\frac{12}{14}$ | 1.943 | 20 | 25 | 1,792 | 19 | $16\frac{7}{15}$ | 1,933 |
| 18 | Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 18 | 36 | 1,673 | 21 | 22 | 1,419 | 18 | $44\frac{10}{15}$ | 1,656 |
| 19 | Common salt (sodium chloride), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then..... ......................... | 27 | $36\frac{7}{14}$ | 1,895 | 22 | 14 | 1,849 | 27 | 39 | 1,892 |
| 20 | Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then......... ..... ..... | 20 | $14\frac{9}{14}$ | 1,605 | 23 | 11 | 1,391 | 20 | 24 | 1,591 |
| 21 | Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899 inclusive. No fertilizers have been applied since then...... .................... ... | 20 | $46\frac{11}{14}$ | 1,783 | 24 | 23 | 1,592 | 21 | $9\frac{9}{15}$ | 1,770 |

## OAT PLOTS.

The quantity of seed sown per acre on the oat plots, was 2 bushels in 1889 and 1890; 1½ bushels in 1891, 1892 and 1893, and 2 bushels from 1894 to 1903, inclusive. The varieties used were as follows: In 1889, Early English; in 1890, 1891, 1892, 1893, Prize Cluster; and from 1894 to 1903, inclusive, the Banner. In 1903 the Banner was sown April 22 and the plots were harvested August 17.

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS, $\frac{1}{10}$ ACRE EACH.

| Number of Plot. | Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn. | Average Yield for Fourteen Years. Yield of Grain. Per acre. | | Average Yield for Fourteen Years. Yield of Straw. Per acre | 15th Season, 1903. Variety, Banner. Yield of Grain. Per acre. | | 15th Season, 1903. Variety, Banner. Yield of Straw. Per acre | Average Yield for Fifteen Years. Yield of Grain. Per acre. | | Average Yield for Fifteen Years. Yield of Straw. Per acre |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. |
| 1 | Barn-yard manure, well rotted. 15 tons per acre each year, to 1898, inclusive. No manure has been applied since then..... | 51 | $13\frac{2}{14}$ | 3,241 | 50 | 25 | 3,015 | 51 | $11\frac{10}{15}$ | 3,226 |
| 2 | Barn-yard manure, fresh, 15 tons per acre each year to 1898, inclusive. No manure has been applied since then............. | 55 | $22\frac{7}{14}$ | 3,422 | 53 | 13 | 2,605 | 55 | $17\frac{5}{15}$ | 3,368 |
| 3 | Unmanured from the beginning........... | 34 | $5\frac{1}{14}$ | 1,689 | 37 | 2 | 2,076 | 34 | $11\frac{10}{15}$ | 1,715 |
| 4 | Mineral phosphate, untreated, finely ground, 500 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899 a similar weight of the Thomas' phosphate was used. No fertilizers have been applied since then........................ | 34 | $7\frac{2}{14}$ | 1,832 | 42 | 32 | 2,008 | 34 | $26\frac{14}{15}$ | 1,844 |
| 5 | Mineral phosphate, untreated, finely ground, 500 lbs. nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then. ......... . | 49 | $13\frac{10}{14}$ | 2,667 | 39 | 14 | 2,580 | 48 | $25\frac{1}{15}$ | 2,661 |
| 6 | Barn-yard manure, partly rotted and actively fermenting, 6 tons per acre; mineral phosphate, untreated, finely ground, 500 lbs. per acre, composted together, intimately mixed and allowed to heat for several days before using, applied each year from 1888 to 1897, inclusive. In 1898, 500 lbs. of Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then.. | 48 | $15\frac{7}{14}$ | 2,720 | 43 | 33 | 2,984 | 48 | $5\frac{5}{15}$ | 2,738 |
| 7 | Mineral phosphate, untreated, finely ground, 500 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,000 lbs. per acre, used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then..................... | 49 | $7\frac{11}{14}$ | 3,152 | 47 | 27 | 3,010 | 49 | $4\frac{8}{15}$ | 3,143 |
| 8 | Mineral phosphate, untreated, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre used each year from 1888 to 1897, inclusive. In 1898 and 1899, 500 lbs. of the Thomas' phosphate was used in place of the mineral phosphate. No fertilizers have been applied since then............ | 43 | $4\frac{11}{14}$ | 2,469 | 50 | 30 | 2,899 | 43 | $22\frac{5}{15}$ | 2,498 |
| 9 | Mineral superphosphate, No. 1, 500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been used since then............................ | 37 | $16\frac{9}{14}$ | 1,972 | 47 | 22 | 2,038 | 38 | $5\frac{10}{15}$ | 1,976 |

EXPERIMENTS WITH FERTILIZERS ON PLOTS OF OATS $\frac{1}{10}$ ACRE EACH—*Continued.*

| No. of Plot. | Fertilizers applied each year, from 1889 to 1898 or 1899. No fertilizers used since. Clover sown in 1899 and each year since with the grain and ploughed under in the autumn. | Average Yield for Fourteen Years. | | | 15th Season, 1903. Variety Banner. | | | Average Yield for Fifteen Years. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Yield of Grain. | | Yield of Straw. | Yield of Grain. | | Yield of Straw. | Yield of Grain. | | Yield of Straw. |
| | | Per acre. | | Per acre | Per acre. | | Per acre | Per acre. | | Per acre |
| | | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. | Bush. | lbs. | Lbs. |
| 10 | Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.. | 47 | $17\frac{10}{14}$ | 2,693 | 38 | 28 | 2,505 | 46 | 32 | 2,680 |
| 11 | Mineral superphosphate, No. 1, 350 lbs.; nitrate of soda, 200 lbs.; wood ashes, unleached, 1,500 lbs. per acre used each year from 1888 to 1897, inclusive. No fertilizers have been applied since then....... | 38 | $29\frac{8}{14}$ | 2,416 | 40 | 30 | 2,581 | 39 | $\frac{2}{15}$ | 2,427 |
| 12 | Unmanured from the beginning.......... | 23 | $4\frac{6}{14}$ | 1,398 | 33 | 23 | 1,820 | 23 | $28\frac{5}{15}$ | 1,426 |
| 13 | Bone, finely ground, 500 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.. | 34 | $26\frac{7}{14}$ | 2,035 | 35 | 20 | 1,850 | 34 | $28\frac{5}{15}$ | 2,023 |
| 14 | Bone, finely ground, 500 lbs.; wood ashes, unleached, 1,500 lbs. per acre, used each year from 1888 to 1899 inclusive. No fertilizers have been applied since then.. | 41 | $10\frac{4}{14}$ | 2,273 | 45 | — | 2,630 | 41 | $18\frac{10}{15}$ | 2,297 |
| 15 | Nitrate of soda, 200 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.. | 47 | $22\frac{5}{14}$ | 2,759 | 40 | 15 | 2,560 | 47 | 6 | 2,746 |
| 16 | Muriate of potash, 150 lbs. per acre, used each year from 1893 to 1899 inclusive. No fertilizers have been applied since then... | 38 | $26\frac{3}{14}$ | 2,207 | 44 | 24 | 2,375 | 39 | $5\frac{10}{15}$ | 2,218 |
| 17 | Sulphate of ammonia, 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.. | 45 | $11\frac{11}{14}$ | 2,820 | 46 | 1 | 2,425 | 45 | $13\frac{5}{15}$ | 2,794 |
| 18 | Sulphate of iron, 60 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then... | 38 | $13\frac{1}{14}$ | 2,018 | 47 | 32 | 1,525 | 39 | —$\frac{11}{15}$ | 1,985 |
| 19 | Common salt (Sodium chloride) 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.............................. | 37 | $25\frac{3}{14}$ | 1,956 | 49 | 4 | 1,545 | 38 | 15 | 1,929 |
| 20 | Land plaster or gypsum (Calcium sulphate), 300 lbs. per acre, used each year from 1888 to 1899, inclusive. No fertilizers have been applied since then.......... .... | 34 | $25\frac{6}{14}$ | 1,959 | 37 | 22 | 2,070 | 34 | 32 | 1,966 |
| 21 | Mineral superphosphate, No. 2, 500 lbs. per acre, used each year from 1889 to 1899, inclusive. No fertilizers have been applied since then.......................... | 35 | 19 | 1,860 | 34 | 24 | 1 854 | 35 | 17 | 1,859 |

## INFLUENCE OF CLOVER, PLOUGHED UNDER, ON FARM CROPS.

The ploughing under of clover has been found most effective as an additional source of fertility. It increases the store of available plant food by the addition of nitrogen obtained directly from the atmosphere. It adds also to the mineral plant food available, potash and phosphoric acid by gathering these from depths not reached by the shallower root systems of other farm crops. It also serves as a catch crop during the autumn months, retaining fertilizing material brought down by the rain, much of which would otherwise be lost. Further it supplies the soil with a large addition of humus whereby it is made more retentive of moisture, and results in a deepening and mellowing of the soil. Humus also furnishes material in which those minute forms of germ life which act so beneficially on the soil can thrive and propagate freely.

Marked benefits have been observed from the use of clover on all the plots referred to. A few examples may be cited, taken from all the series.

On plot 7, of the oat series, 500 pounds of fine ground mineral phosphate untreated was used per acre for nine years, and during the two following years 500 pounds of the Thomas phosphate, in place of the untreated mineral phosphate. There was also used on these plots yearly for 11 years, 200 pounds of nitrate of soda and 1,000 pounds of unleached wood ashes per acre. With this large annual application of artificial fertilizers the crop of oats had averaged for ten years 44 bushels 30 pounds per acre. With the discontinuance of the fertilizers and the use of clover the crop in bushels and pounds per acre for the five succeeding years was 58·18; 65·15; 56·31; 57·27, and 47·27. These figures show an average increase in the crop of oats for the five years of 12 bushels 14 pounds per acre, or more than 25 per cent.

On plot 11 in the oat series there were used annually for ten years 350 pounds of mineral superphosphate, 200 pounds of nitrate of soda and 1,500 pounds of unleached wood ashes. The crop during this period gave an average of 36 bushels 5 pounds per acre. With the discontinuance of the fertilizers and the use of clover, the crops for the past five years in bushels and pounds per acre were 37·2; 45·20; 49·29; 51·6, and 40·30, an average increase in crop of 8 bushels 26 pounds, or more than 22 per cent.

On plot 14 in this series fine ground bone was used annually in the proportion of 500 pounds per acre, with 1,500 pounds of unleached wood ashes. At the end of ten years the crop of oats had averaged 37 bushels 6 pounds per acre. With the discontinuance of the bone and ashes and the use of clover the crops for the five succeeding years in bushels and pounds per acre have been as follows: 42·27; 62·2; 49·14; 50·25, and 45, an average increase in crop for the five years of 12 bushels 28 pounds per acre, or more than 30 per cent.

On plot 3 in this series, oats had been grown for ten years in succession without the application of any fertilizer whatever. The crops for the ten years had averaged 30 bushels 23 pounds per acre. With the subsequent use of clover they have stood for the past five years as follows: 29 bushels 2 pounds; 47·2; 48·3; 46·11, and 37·2, an average increase for the five years, of 10 bushels 28 pounds, more than 31 per cent. This is an astonishing increase in view of the fact that oats had been grown every year on the same land for the whole period, and that during the five years when this increase occurred clover was the only fertilizing agent used.

Taking the same series of plots in wheat, which have received the same fertilizers in the same quantities, but for eleven years instead of ten, we find :

On plot 7 of the wheat series the crop for eleven years under the annual fertilizing mentioned under oats averaged 12 bushels 48 pounds per acre. With the discontinuance of the fertilizers and the annual use of clover the crops for the five succeeding years were 12 bushels 50 pounds; 13·20; 16·50; 17·5, and 18·10, an average increase for the five years, of 2 bushels 56 pounds per acre, more than 23 per cent.

In plot 11 in the wheat series the average crop for the eleven years during which the fertilizers were applied was 13 bushels 31 pounds. With the discontinuance of the fertilizers and the annual use of clover the crops for the five succeeding years were 18·30; 18·20; 16·5; 14·40, and 14 bushels 20 pounds per acre, an average increase for the five years of 2 bushels 52 pounds per acre equal to 22 per cent.

On plot 14 the influence of the clover is not so marked, the increase being a little over 10 per cent.

On plot 3, on which wheat was grown for 11 years without the use of any fertilizer the crops during this period averaged 10 bushels, 16 pounds per acre. With the subsequent use of clover they have stood for the past five years as follows: 10·35; 13·45 17·20; 16·50, and 14 bushels 30 pounds, an average increase for the five years of 4 bushels 20 pounds per acre, more than 40 per cent.

On plot 7 of the barley series the crop for ten years averaged 22 bushels 26 pounds per acre, with the discontinuance of the fertilizers and the annual use of clover the

(Photo. by Frank T. Shutt.)

COVER CROP. HAIRY VETCH, CENTRAL EXPERIMENTAL FARM, SEPTEMBER 21, 1903. SOWN IN DRILLS, JUNE 18, 1903.

(Photo. by Frank T. Shutt.)

COVER CROP. HORSE BEANS, CENTRAL EXPERIMENTAL FARM, SEPTEMBER 13, 1903. SOWN IN DRILLS JUNE 18, 1903.

crops for the five succeeding years were 35·15; 32·2; 27·24; 42·34, and 30 bushels 25 pounds, an average increase for the five years of 11 bushels 3 pounds per acre, equal to more than 48 per cent.

On plot 11 of the barley series the increase in crop from clover has been less. During the ten years when the fertilizers were used the crop averaged 25 bushels 33 pounds. With the discontinuance of the fertilizers and the annual use of clover the crops for the five years following were 30·45; 26·32; 19·8; 41·42, and 29 bushels 38 pounds per acre, an average increase for the five years of 4 bushels per acre, somewhat over 15 per cent.

On plot 14 during the ten years when the fertilizers were used the crop of barley averaged 22 bush. 1 lb. per acre. With the discontinuance of the fertilizers and the annual use of clover the crops for the five years following were 26·2; 25·35; 21·2; 41·2, and 26 bush. 12 lbs. per acre, an average increase for the five years of 6 bushels per acre, more than 25 per cent.

On plot 3 on which barley was grown for 10 years without use of any fertilizer, the crop during this period averaged 13 bush. 32 lbs., but the crop on the tenth year was reduced to 8 bush. 6 lbs. per acre. With the subsequent use of clover the crops have stood for the past five years as follows: 10·40; 9·33; 10·15; 27·4; and 23 bush. 36 lbs. per acre, an average increase for the five years of 2 bush. 32 lbs. per acre, nearly 20 per cent.

The results were still more marked with Indian corn. This crop on plot 3, after 10 years' test, was reduced to about 2 tons per acre. With one crop of clover, turned under, the yield of Indian corn was increased to over 8 tons per acre. On plot 11 the average of 10 years was 13 tons 1,090 pounds per acre. The ploughing under of a single crop of clover raised this the following season to 26 tons 505 pounds per acre.

On field roots, the beneficial action of clover ploughed under was also very striking. The turnips grown on plot 3 with no fertilizer for the 10 years ending with 1899, averaged 6 tons 1,863 pounds per acre, with one crop of clover ploughed under the average for the two years following was 10 tons 1,560 pounds, an average increase of 3 tons 1,697 pounds per acre; more than 50 per cent.

The mangels on plot 3 had given an average to 1899, of 8 tons 1,587 pounds. The two years following the turning under of clover the crop averaged 10 tons 1,560 pounds, an increase of 2 tons per acre, or nearly 25 per cent.

Many similar instances could be given, but enough has perhaps been presented to establish the fact that the ploughing under of clover gives a large increase to the crop which follows, and in addition to the fertilizing material contributed by the clover the humus thus added to the soil conserves moisture and enables the rootlets of the growing plants to utilize a larger proportion of the plant food which the soil contains.

## INCREASED CROPS FROM THE PLOUGHING UNDER OF CLOVER.

The following tests were planned in 1900 when sufficient plots were sown with grain, on one-half of which clover was sown at the same time, in the proportion of 12 pounds of seed per acre, leaving alternate plots on which no clover was sown.

### GROUP NO. 1, DIVISION 1.

On this series of six plots, side by side Banner oats were sown in 1901, Everett potatoes in 1902 and Selected Leaming corn in 1903. The following table shows the increased crops, resulting from one crop of clover, the first, second and third years after ploughing under.

| Results obtained from alternate plots with and without clover. | 1901. | | | 1902. | | 1903. | |
|---|---|---|---|---|---|---|---|
| | Banner Oats. | | | Everett Potatoes. | | Selected Leaming Corn. | |
| | Yield of Grain per acre. | | Weight of Straw per acre. | Yield per acre. | | Yield per acre. | |
| | Bush. | lbs. | Lbs. | Bush. | lbs. | Tons. | lbs. |
| 1 Crops in 1901-2-3 after clover in 1900 | 49 | 14 | 3,440 | 293 | 20 | 13 | 1,760 |
| 2 " 1901-2-3 on plot where no clover was grown | 47 | 2 | 2,480 | 274 | 40 | 12 | 800 |
| Gain from use of clover | 2 | 12 | 960 | 18 | 40 | 1 | 960 |
| 3 Crops in 1901-2-3 after clover in 1900 | 42 | 12 | 2.640 | 272 | .. | 10 | 960 |
| 4 " 1901-2-3 on plot where no clover was grown | 37 | 22 | 1,920 | 270 | 40 | 9 | 1,040 |
| Gain from use of clover | 4 | 24 | 720 | 1 | 20 | .. | 1,920 |
| 5 Crops in 1901-2-3 after clover in 1900 | 40 | .. | 3,040 | 353 | 20 | 12 | 1,440 |
| 6 " 1901-2-3 on plot where no clover was grown | 35 | 10 | 2,240 | 333 | 20 | 10 | 800 |
| Gain from use of clover | 4 | 24 | 800 | 20 | .. | 2 | 640 |

In Division 1, the three plots of Banner oats after clover, show for the first year an average gain per acre from the use of clover of 3 bush. 31 lbs. of grain and 827 lbs. of straw. The same plots in potatoes the second year show an average gain of 13 bush. 20 lbs., and the same plots planted with Indian corn the third year an average gain from the use of clover of 1 ton 1,173 lbs. per acre.

### DIVISION NO. 2.

In this series of six plots, side by side, Everett potatoes were sown in 1901, Selected Leaming corn in 1902, and Banner oats in 1903, and the following results obtained:—

| Results obtained from alternate plots with and without clover. | 1901. | | 1902. | | 1903. | | |
|---|---|---|---|---|---|---|---|
| | Everett Potatoes. | | Selected Leaming Corn. | | Banner Oats. | | |
| | Yield per acre. | | Yield per acre. | | Yield of Grain per acre. | | Weight of Straw per acre. |
| | Bush. | lbs. | Tons. | lbs. | Bush. | lbs. | Lbs. |
| 7 Crops in 1901-2-3 after clover in 1900 | 440 | .. | 19 | .. | 62 | 12 | 3,200 |
| 8 " 1901-2-3 on plot where no clover was grown | 396 | 40 | 16 | 1,600 | 50 | 20 | 3,080 |
| Gain from use of clover | 3 | 20 | 2 | 400 | 11 | 26 | 120 |
| 9 Crops in 1901-2-3 after clover in 1900 | 420 | .. | 16 | 640 | 60 | .. | 4,200 |
| 10 " 1901-2-3 on plot where no clover was grown | 396 | .. | 15 | 880 | 54 | 4 | 2,160 |
| Gain from use of clover | 24 | .. | .. | 1,760 | 5 | 30 | 2,040 |
| 11 Crops in 1901-2-3 after clover in 1900 | 411 | 20 | 20 | 200 | 65 | 30 | 4,200 |
| 12 " 1901-2-3 on plot where no clover was grown | 381 | 20 | 16 | 1,600 | 44 | 24 | 2,800 |
| Gain from use of clover | 30 | .. | 3 | 600 | 21 | 6 | 1,400 |

In Division No. 2 the three plots of Everett potatoes after clover show, for the first year, an average gain per acre from the use of clover of 19 bushels 7 lbs. The same plots in Indian corn the second year show an average gain of 2 tons 253 lbs and the same plots sown the third year with Banner oats show an average gain from the use of clover of 12 bush. 32 lbs. of grain and 1,187 lbs. of straw.

### GROUP NO. 2.

In each of the three divisions in this group there were three plots. In the upper one in each table the crops were sown after clover ploughed under in the autumn of 1900, and in the lower one clover was also sown in the spring of 1900 and allowed to grow for two seasons and was ploughed under in the autumn of 1901. On the middle plot no clover was grown. It will be seen that considerable gains were made by the use of clover in both cases.

| Division No. 1. | 1901. Corn, Selected Leaming. — Yield per Acre. | | 1902. Banner Oats. Yield of Oats per Acre. | | 1902. Banner Oats. Weight of Straw per Acre | 1903. Potatoes, Everett. — Yield per Acre. | |
|---|---|---|---|---|---|---|---|
| | Tons. | Lbs. | Bus. | Lbs. | Lbs. | Bus. | Lbs. |
| 1 Crops in 1901-2-3, after clover in 1900 | 25 | 1,600 | 70 | 20 | 3,840 | 195 | 20 |
| 2 Crops in 1901-2-3, on plot where no clover was grown in 1900. | 20 | 160 | 58 | 28 | 3,120 | 175 | 20 |
| Gain from use of clover | 5 | 1,440 | 11 | 26 | 720 | 20 | 00 |
| 3 Crops in 1902-3, on plot, where clover was allowed to grow two seasons | ........ | | 65 | 30 | 4,400 | 221 | 20 |
| Gain from use of clover | .......... | | 7 | 2 | 1,280 | 45 | 40 |

| Division No 2. | 1901. Corn, Selected Leaming. — Yield per Acre. | | 1902. Banner Oats. Yield of Oats Per Acre. | | 1902. Banner Oats. Weight of Straw per Acre | 1903. Carrots. — Yield per Acre. | |
|---|---|---|---|---|---|---|---|
| | Tons. | Lbs. | Bus. | Lbs. | Lbs. | Tons. | Lbs. |
| 4 Crops in 1901-2-3, after clover in 1900 | 27 | 880 | 70 | 20 | 3,920 | 31 | 960 |
| 5 Crops in 1901-2-3, on plots where no clover was grown in 1900 | 15 | 1,600 | 47 | 2 | 2,000 | 20 | 640 |
| Gain from use of clover | 11 | 1,280 | 23 | 18 | 1,920 | 11 | 320 |
| 6 Crops in 1902-3, on plot where clover was allowed to grow two seasons | .......... | | 72 | 32 | 3,760 | 21 | 600 |
| Gain from use of clover | ..... .... | | 25 | 30 | 1,760 | | 1,960 |

| Division No. 3. | 1901. Corn, Selected Leaming. — Yield per Acre. | | 1902. Banner Oats. Yield of Oats per Acre. | | 1902. Banner Oats. Weight of Straw per Acre | 1903. Sugar Beets. — Yield per Acre. | |
|---|---|---|---|---|---|---|---|
| | Tons. | Lbs. | Bus. | Lbs. | Lbs. | Tons. | Lbs. |
| 7 Crops in 1901-2-3, after clover in 1900 | 27 | 1,760 | 75 | 10 | 4,160 | 22 | 600 |
| 8 Crops in 1901-2-3, on plot where no clover was grown in 1900 | 19 | 1,280 | 51 | 26 | 2,320 | 8 | 1,200 |
| Gain from use of clover | 8 | 480 | 23 | 18 | 1,840 | 13 | 1,400 |
| 9 Crops in 1902-3, on plot, where clover was allowed to grow two seasons | ......... | | 68 | 8 | 4,080 | * | |
| Gain from use of clover | .... .... | | 16 | 16 | 1,760 | | |

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* Did not germinate.

## GROUP No. 3.

| Division 1. | 1902. Banner Oats. Yield of Oats Per Acre. | | 1902. Banner Oats. Weight of Straw Per Acre. | 1903. Turnips. Yield Per Acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | Lbs. | Tons. | Lbs. |
| 1 Crops in 1902-3, after clover in 1901 | 70 | 20 | 4,720 | 25 | |
| 2 Crops in 1902-3, on plot where no clover was grown in 1901 | 58 | 28 | 3,120 | 20 | 1,920 |
| Gain from use of clover | 11 | 26 | 1,600 | 4 | 80 |

| Division 2. | 1902. Potatoes Everett. Yield Per Acre. | | 1903. Carrots. Yield Per Acre. | | 1902. Corn, Selected Leaming. Yield Per Acre. | | 1903. Potatoes Everett. Yield Per Acre. | |
|---|---|---|---|---|---|---|---|---|
| | Bush. | Lbs. | Tons. | Lbs. | | | | |
| 3 Crops in 1902-3, after clover in 1901 | 392 | 40 | 20 | 1,400 | ..... | ...... | | |
| 4 Crops in 1902-3, on plot where no clover was grown in 1901 | 358 | | 18 | 280 | ...... | ...... | | |
| Gain from use of clover | 34 | 40 | 2 | 1,120 | ...... | ...... | | |
| | | | | | Tons. | Lbs. | Bush. | Lbs. |
| 5 Crops in 1902-3, after clover in 1901 | ...... | ...... | ...... | ...... | 20 | 800 | 202 | |
| 6 Crops in 1902-3, on plot where no clover was grown in 1901 | ...... | ...... | ...... | ...... | 15 | | 154 | 40 |
| Gain from use of clover | ...... | ...... | ...... | ...... | 5 | 800 | 47 | 20 |
| 7 Crops in 1903, on plot where clover was allowed to grow two seasons | ...... | ...... | ...... | ...... | ...... | ...... | 200 | 40 |
| 8 Crops in 1903, on plot where no clover was grown in 1901 | ...... | ...... | ...... | ...... | ...... | ...... | 134 | 40 |
| Gain from use of clover | .... | .... | ...... | ...... | .. .. | ..... | 66 | 00 |

| Division 3. | 1902 Banner Oats. Yield of Oats Per Acre. | | 1902 Banner Oats. Weight of Straw Per Acre. | 1903 Mangels. Yield Per Acre. | | 1902 Potatoes Everett. Yield Per Acre. | | 1903 Sugar Beets. Yield Per Acre. | |
|---|---|---|---|---|---|---|---|---|---|
| | Bush. | Lbs. | Lbs. | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. |
| 9 Crops in 1902-3, after clover in 1901 | 70 | 20 | 4,960 | 30 | 1,000 | .. | .. | | |
| 10 Crops in 1902-3, on plot where no clover was grown in 1901 | 61 | 6 | 2,720 | 27 | 320 | .. | .. | | |
| Gain from use of clover | 9 | 14 | 2,240 | 3 | 680 | .. | .. | | |
| 11 Crops in 1902-3, after clover in 1901 | .. | .. | .. .. | .. | .. | 386 | 20 | 20 | 680 |
| 12 Crops in 1902-3, on plot where no clover was grown in 1901 | .. | .. | .. .. | .. | .. | 346 | 40 | 16 | 1,040 |
| Gain from use of clover | .. | .. | .. .. | .. | . | 39 | 40 | 3 | 1,640 |

## GROUP No. 3—*Concluded.*

| Division 4. | 1902 Corn, Selected Leaming. | | 1903 Corn, Selected Leaming. | | 1902 Banner Oats. | | | 1903 Preston Wheat. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Yield Per Acre. | | Yield Per Acre. | | Yield of Oats Per Acre. | | Weight of Straw Per Acre. | Yield of Wheat Per Acre. | | Weight of Straw Per Acre. |
| | Tons. | Lbs. | Tons. | Lbs. | Bush | Lbs. | Lbs. | Bus. | Lbs. | Lbs. |
| 13 Crops in 1902-3, after clover in 1901. | 23 | 1,200 | 18 | 1,440 | .. | .. | .. .. | .. | .. | |
| 14 Crops in 1902-3, on plot where no clover was grown in 1901 | 17 | 720 | 14 | 1,200 | .. | .. | .. .. | .. | .. | |
| Gain from use of clover | 6 | 480 | 4 | 240 | .. | .. | .. .. | .. | .. | |
| 15 Crops in 1903, on plot where clover was allowed to grow two seasons | .. | .. | 15 | 1,600 | .. | .. | .. .. | .. | .. | |
| 16 Crops in 1902-3, on plot where no clover was grown in 1901 | .. | .. | 7 | .. | .. | .. | .. .. | .. | .. | |
| Gain from use of clover | .. | .. | 8 | 1,600 | .. | . | .. .. | .. | .. | |
| 17 Crops in 1902-3, after clover in 1901 | .. | .. | .. | .. | 72 | 32 | 5,280 | 16 | .. | 1,760 |
| 18 Crops in 1902-3, on plots where no clover was grown in 1901 | .. | .. | .. | .. | 63 | 18 | 3,280 | 14 | 40 | 1,400 |
| Gain from use of clover | .. | .. | .. | .. | 9 | 14 | 2,000 | 1 | 20 | 360 |

| Division 5. | 1902 Potatoes Everett. | | 1903 Mensury Barley. | | | 1902 Corn Selected Leaming. | | 1903 Banner Oats. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Yield Per Acre. | | Yield of Barley Per Acre. | | Weight of Straw Per Acre. | Yield Per Acre. | | Yield of Oats Per Acre. | | Weight of Straw Per Acre. |
| | Bus. | Lbs. | Bus. | Lbs. | Lbs. | Tons. | Lbs. | Bus. | Lbs. | Lbs. |
| 19 Crops in 1902-3, after clover in 1901 | 396 | .. | 51 | 32 | 2,640 | .. | .. | .. | .. | |
| 20 Crops in 1902-3, on plot where no clover was grown in 1901 | 353 | 20 | 50 | .. | 2,520 | .. | .. | .. | .. | |
| Gain from use of clover | 42 | 40 | 1 | 32 | 120 | .. | .. | .. | .. | |
| 21 Crops in 1902-3, after clover in 1901 | .. | .. | .. | .. | .. .. | 22 | 1,600 | 82 | 12 | 3,920 |
| 22 Crops in 1902-3, on plot where no clover was grown in 1901 | .. | . | .. | .. | .. .. | 16 | 800 | 76 | 16 | 3,240 |
| Gain from use of clover | .. | .. | . | .. | .. .. | 6 | 800 | 5 | 30 | 680 |
| 23 Crops in 1903, on plot where clover was allowed to grow two seasons | . | .. | .. | .. | .. .. | .. | .. | 87 | 2 | 4,880 |
| 24 Crops in 1903, on plot where no clover was grown in 1901 | .. | .. | .. | .. | .. .. | .. | .. | 74 | 4 | 4,080 |
| Gain from use of clover | .. | .. | .. | .. | .. .. | .. | .. | 12 | 32 | 800 |

In all these examples also there are gains from the use of clover and on some of the plots they are so large as to be quite remarkable.

# EFFECTS OF FERTILIZERS ON SPRING WHEAT, OATS, CLOVER AND BROME GRASS.

During the season of 1900, two series consisting in each case of sixteen one-eightieth acre plots were laid out, twelve of which in each set were treated with different fertilizers, and the remaining four left as check plots which received no fertilizers.

One set of these plots was sown with spring wheat of the variety known as Preston, another with a variety of oats known as Improved Ligowo. Two other series each consisting of nine plots were planned, one to be used for experiments with common red clover, and the other for the Awnless Brome grass *(Bromus inermis)*.

The object in view in these tests is to gain information as to the effects on crops sown on land in a fair average condition of fertility, of superphosphate of lime and Thomas' phosphate both used singly, also of superphosphate of lime with kainit and with kainit and nitrate of soda, and of Thomas' phosphate with kainit, and with kainit and nitrate of soda. In the several series of plots planned provision was also made for testing the relative value of barn-yard manure fresh and rotted, fresh slaked lime and of nitrate of soda alone in the proportions of 100 and 200 pounds per acre with a check plot between them.

The land chosen for this test was in a fairly good condition of tilth. The soil was a sandy loam which has been under cultivation since 1887, and has been cropped each year since with a suitable rotation of crops, and has received a dressing of barn-yard manure about once in four years. The last application of manure was in 1897, when it received about 12 tons per acre. The land was cropped in 1899 with experimental plots of grain, mostly barley.

It is proposed to grow the same crops on this land for some years, using the same fertilizers in the same quantities every second year. In this way it is hoped that some further information may be gained as to the effect of these different fertilizers when used singly and in combination on the important crops named. As this land was at the start in a fair average condition as to fertility, it may be regarded as representing in a general way average sandy loams on farms properly worked. The fertilizers were first applied in the spring of 1900, and a second time in the spring of 1902.

### RESULTS OF THE APPLICATION OF FERTILIZERS TO SPRING WHEAT.

Sown April 27, Ripe August 15, 1903.

| No. of plot. | Name of Variety, Preston. | Yield of Grain per acre. | | Yield of Straw per acre. |
|---|---|---|---|---|
| | | Bush. | Lbs. | Lbs. |
| 1 | Superphosphate, 400 lbs. per acre | 18 | — | 2,840 |
| 2 | Thomas' phosphate, 400 lbs. per acre | 16 | 40 | 2,400 |
| 3 | Thomas' phosphate, 800 lbs. per acre | 20 | — | 3,040 |
| 4 | Check | 16 | — | 1,760 |
| 5 | Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre | 20 | — | 3,280 |
| 6 | Superphosphate, 400 lbs., kainit, 200 lbs., per acre | 16 | 40 | 3,400 |
| 7 | Check | 14 | 40 | 1,400 |
| 8 | Thomas' phosphate, 400 lbs., kainit 200 lbs., nitrate soda 100 lbs. per acre | 20 | — | 3,600 |
| 9 | Superphosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre | 16 | — | 3,600 |
| 10 | Barn-yard manure, mixed horse and cow, fresh, 12 tons per acre | 11 | 40 | 1,720 |
| 11 | Barn-yard manure, mixed horse and cow, well rotted, 12 tons per acre | 13 | 40 | 1,980 |
| 12 | Check | 9 | 20 | 1,140 |
| 13 | Fresh slacked lime, 1,000 lbs. per acre | 11 | 40 | 1,460 |
| 14 | Nitrate soda, 100 lbs. per acre | 6 | 40 | 840 |
| 15 | Check | 12 | — | 1,480 |
| 16 | Nitrate soda, 200 lbs. per acre | 10 | — | 1,560 |

### RESULTS OF THE APPLICATION OF FERTILIZERS TO OATS.

### Sown April 27, Ripe August 17, 1903.

| No. of plot. | Name of Variety, Improved Ligowo. | Yield of Grain per acre. | | Yield of Straw per acre. |
|---|---|---|---|---|
| | | Bush. | Lbs. | Lbs. |
| 1 | Superphosphate, 400 lbs. per acre | 43 | 18 | 2,280 |
| 2 | Thomas' phosphate, 400 lbs. per acre | 52 | 32 | 2,480 |
| 3 | Thomas' phosphate, 800 lbs. per acre | 47 | 2 | 2,720 |
| 4 | Check | 42 | 12 | 1,960 |
| 5 | Thomas' phosphate, 400 lbs., kainit, 200 lbs. per acre | 44 | 24 | 2,080 |
| 6 | Superphosphate, 400 lbs, kainit, 200 lbs. per acre | 48 | 8 | 2,600 |
| 7 | Check | 43 | 18 | 2,280 |
| 8 | Thomas' phosphate, 400 lbs., kainit, 200 lbs., nitrate soda, 100 lbs. per acre | 44 | 24 | 3,160 |
| 9 | Superphosphate, 400 lbs.. kainit, 200 lbs., nitrate soda, 100 lbs. per acre | 54 | 4 | 3,080 |
| 10 | Barn-yard manure, mixed horse and cow, fresh, 12 tons per acre | 57 | 22 | 3,760 |
| 11 | Barn-yard manure, mixed horse and cow, well rotted, 12 tons per acre | 64 | 24 | 3,560 |
| 12 | Check | 63 | 18 | 3,840 |
| 13 | Fresh slacked lime. 1,000 lbs. per acre | 77 | 22 | 3,960 |
| 14 | Nitrate soda, 100 lbs. per acre | 69 | 14 | 3,560 |
| 15 | Check | 62 | 12 | 3,280 |
| 16 | Nitrate soda, 200 lbs. per acre | 68 | 8 | 4,280 |

### RESULTS OF THE APPLICATION OF FERTILIZERS TO AWNLESS BROME GRASS (*Bromus inermis*).

### Crop cut July 9, 1903.

| No. of Plot. | Fertilizers used. | Height of Brome Grass | YIELD PER ACRE. | | | |
|---|---|---|---|---|---|---|
| | | | Green. | | Cured. | |
| | | Inches. | Tons. | lbs. | Tons. | lbs. |
| 1 | Superphosphate, 400 lbs. per acre | 38—42 | 8 | 1,360 | 3 | 1,600 |
| 2 | Thomas' phosphate, 400 lbs. per acre | 36—40 | 6 | 1,360 | 2 | 1,600 |
| 3 | Thomas' phosphate, 800 lbs. per acre | 34—38 | 4 | 240 | 1 | 1,440 |
| 4 | Check | 28—32 | 2 | 1,600 | 1 | 160 |
| 5 | Thomas' phosphate, 400 lbs. ; kainit, 200 lbs. per acre | 31—35 | 3 | 400 | 1 | 400 |
| 6 | Superphosphate, 400 lbs. ; kainit, 200 lbs. per acre | 31—35 | 3 | 400 | 1 | 480 |
| 7 | Check | 34—38 | 4 | — | 1 | 1,200 |
| 8 | Thomas' phosphate, 400 lbs. ; kainit, 200 lbs. ; nitrate soda, 100 lbs. per acre | 34—38 | 3 | 520 | 1 | 680 |
| 9 | Superphosphate, 400 lbs. ; kainit, 200 lbs. ; nitrate soda, 100 lbs. per acre | 36—40 | 4 | 720 | 1 | 1,600 |
| 10 | Barn-yard manure, mixed horse and cow, fresh, 12 tons per acre | 36—40 | 4 | 1,760 | 2 | 80 |
| 11 | Barn-yard manure, mixed horse and cow, well rotted, 12 tons p. acre | 36—40 | 3 | 800 | 1 | 800 |
| 12 | Check | 30—34 | 2 | 800 | — | 1,840 |
| 13 | Fresh slacked lime, 1000 lbs. per acre | 25—29 | 1 | 1,760 | — | 1,440 |
| 14 | Nitrate soda, 100 lbs. per acre | 25—29 | 3 | 1,200 | 1 | 800 |
| 15 | Check | 30—35 | 2 | 1,920 | 1 | 640 |
| 16 | Nitrate soda, 200 lbs. per acre | 33—38 | 4 | 640 | 1 | 1,680 |

### RESULTS OF THE APPLICATION OF FERTILIZERS TO CLOVER.

First cutting July 9, second Sept. 3, 1903.

| No. of Plot. | Fertilizers used. | Height of Clover. | | Yield per Acre. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1st Cutting. | | | | 2nd Cutting | | | |
| | | 1st Cutting. | 2nd Cutting. | Green. | | Cured. | | Green. | | Cured. | |
| | | Inches | Inches. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. | Tons. | lbs. |
| 1 | Superphosphate, 400 lbs. per acre | 18—23 | 19—24 | 8 | 160 | 2 | 400 | 8 | 1,920 | 2 | 640 |
| 2 | Thomas' phosphate, 400 lbs. per acre | 18—23 | 19—24 | 9 | 1,120 | 2 | 1,200 | 10 | 80 | 2 | 1,280 |
| 3 | Thomas' phosphate, 800 lbs. per acre | 20—25 | 20—25 | 9 | 1,240 | 2 | 1,120 | 9 | 440 | 2 | 720 |
| 4 | Check | 18—23 | 18—23 | 8 | 1,880 | 2 | 760 | 9 | 1,240 | 2 | 1,080 |
| 5 | Thomas' phosphate, 400 lbs.; kainit, 200 lbs. per acre | 20—25 | 18—23 | 8 | 960 | 2 | 960 | 9 | 80 | 2 | 640 |
| 6 | Superphosphate, 400 lbs.; kainit, 200 lbs. per acre | 18—23 | 17—22 | 7 | 1,040 | 2 | 240 | 9 | 640 | 2 | 560 |
| 7 | Check | 16—21 | 18—23 | 7 | 640 | 2 | 80 | 9 | 1,520 | 2 | 1,120 |
| 8 | Thomas' phosphate, 400 lbs.; kainit, 200 lbs.; nitrate soda, 100 lbs. per acre | 18—23 | 20—25 | 6 | 1,600 | 2 | — | 9 | 560 | 2 | 960 |
| 9 | Superphosphate, 400 lbs; kainit, 200 lbs.; nitrate soda, 100 lbs. per acre | 18—23 | 20—25 | 6 | 1,200 | 1 | 1,760 | 10 | — | 2 | 1,440 |
| 10 | Barn-yard manure, mixed horse and cow, fresh, 12 tons per acre | 18—23 | 20—25 | 6 | 480 | 1 | 1,200 | 11 | 1,360 | 3 | 320 |
| 11 | Barn-yard manure, mixed horse and cow, well rotted, 12 tons per acre | 18—23 | 20—25 | 7 | 80 | 2 | 1,200 | 10 | 160 | 2 | 1,120 |
| 12 | Check | 16—21 | 18—23 | 4 | 1,440 | 1 | 1,840 | 9 | 80 | 2 | 640 |
| 13 | Fresh slacked lime, 1,000 lbs. per acre | 18—23 | 20—25 | 7 | 1,040 | 2 | 560 | 11 | 1,280 | 2 | 1,840 |
| 14 | Nitrate soda, 100 lbs. per acre | 18—23 | 20—25 | 6 | 1,600 | 1 | 1,600 | 8 | 1,600 | 2 | 640 |
| 15 | Check | 18—23 | 18—23 | 7 | 1,600 | 2 | — | 8 | 1,920 | 2 | 480 |
| 16 | Nitrate soda, 200 lbs. per acre | 20—25 | 20—25 | 8 | 1,920 | 2 | 880 | 11 | 320 | 2 | 1,840 |

## CORRESPONDENCE.

A large correspondence has been maintained during 1903 between the farmers of Canada and the officers of the experimental farms.

### CENTRAL EXPERIMENTAL FARM.

The following is a summary of the letters received and sent out at the Central Experimental Farm from December 1, 1902, to November 30, 1903; also the number of reports, bulletins and circulars forwarded by mail during the same period.

| | Letters received. | Letters sent. |
|---|---|---|
| Director | 40,490 | 17,081 |
| Agriculturist | 3,251 | 2,815 |
| Horticulturist | 1,237 | 1,266 |
| Chemist | 1,234 | 1,163 |
| Entomologist and Botanist | 3,059 | 2,664 |
| Experimentalist (part of year) | 386 | 372 |
| Poultry manager | 1,587 | 1,145 |
| Accountant | 824 | 799 |
| | 52,068 | 27,305 |

A large number of the letters received by the Director are applications for samples of grain or for the publications of the farms a considerable proportion of which are answered by sending the correspondents the material asked for, accompanied by circular letters. This explains why the number of letters received so much exceeds the number sent out..

| | |
|---|---|
| Circular letters including circulars sent with samples of seed grain.... .... .... .... .... .... ........ .. | 32,074 |
| Reports and bulletins mailed............... ....... ..... .. | 248,673 |

BRANCH EXPERIMENTAL FARMS.

The correspondence with the Superintendents of the branch experimental farms is also large as is shown by the following figures:—

| | Letters received. | Letters sent. |
|---|---|---|
| Experimental Farm, Nappan, N.S............ | 1,840 | 1,685 |
| Experimental Farm, Brandon, Man. .... ...... | 3,767 | 2,848 |
| Experimental Farm, Indian Head, N.W.T...... | 4,926 | 4,980 |
| Experimental Farm, Agassiz, B.C.... .... .... | 2,767 | 2,570 |
| | 13,300 | 12,083 |

Much additional information has also been sent out from the branch farms in printed circulars.

By adding the correspondence conducted at the branch farms to that of the central farm it will be seen that 65,365 letters were received and 39,358 sent out during the year.

A large proportion of these letters are from correspondents who seek information on all sorts of subjects relating to farm work, stock raising, dairying, fruit growing, poultry raising, &c. For the first two years after the experimental farms were established the letters received averaged 9,300 each year, whereas during the past six years the annual average has amounted to 64,411, showing the great growth of this branch of the service.

During the same period the number of reports and bulletins sent out each year has averaged 214,691. Thus a constant stream of information is going out from the experimental farms, helpful to farmers in their endeavours to make their calling more profitable.

## CO-OPERATIVE EXPERIMENTS BY CANADIAN FARMERS.

The Dominion experimental farms were established in 1887 and in the spring of 1888 the useful work of assisting farmers with samples of high class seed grain for test was begun; hence they have co-operated with the experimental farms from the start in the endeavour to find out which varieties of the several cereals were the earliest to ripen and the most generally productive under the many different climatic conditions found in this country. In 1888 the number of samples distributed was 2,760. Every year since then this useful branch of the work has been continued, it rapidly assumed large proportions, and is much appreciated by farmers everywhere. The greatest pains are taken to send the grain out perfectly clean. Sometimes with the most approved cleaning apparatus this cannot be thoroughly done and in all such cases the grain is hand-picked. Many thousands of pounds are thus treated every year. Every effort is also made to have the samples true to name and of the most productive strains.

During the past ten years the number of samples distributed annually has averaged 35,030 and the total number sent out from 1888 to the end of 1903 is 421,312, which has involved the use of over 638 tons of first class material. Of these samples 368,245 have been sent out from the Central Farm at Ottawa and 53,067 from the branch farms. Hundreds of letters are received every year from farmers expressing their gratitude for the samples sent, as in this way they obtain at no cost beyond their own labour, pure seed of the choicest quality. There is no doubt that the quality, character and productiveness of the grain raised throughout the entire Dominion has been influenced very largely by the placing of these samples in the hands of so many good farmers.

During the season of 1903 the distribution was somewhat modified. While in the past the greater part of the samples distributed have weighed three pounds each, for the last three years there have been sent to a limited number of farmers who have taken a special interest in this work enough of the leading cereals to sow one-tenth of an acre. To these parties 8 pounds of oats or 10 pounds of wheat or barley have been sent. These larger samples have been very much appreciated, but since in some instances it produced dissatisfaction on the part of those who received the smaller samples, it has been thought best to put all the applicants on the same footing, and send to all who apply for samples of these cereals 4 pounds of oats and 5 pounds of wheat or barley, which would be enough in each case for a twentieth acre plot. The samples of pease, Indian corn and potatoes weigh 3 pounds each, as heretofore.

The samples sent from the Central Experimental Farm during the early months of 1903 have been distributed as follows:—

| Name of Grain. | Prince Edward Island. | Nova Scotia. | New Brunswick. | Quebec. | Ontario. | Manitoba. | Northwest Territories. | British Columbia. |
|---|---|---|---|---|---|---|---|---|
| Oats | 508 | 1,083 | 990 | 3,228 | 2,079 | 519 | 539 | 84 |
| Barley | 127 | 336 | 177 | 1,362 | 676 | 185 | 227 | 38 |
| Wheat | 245 | 496 | 571 | 1,859 | 558 | 304 | 380 | 54 |
| Pease | 24 | 165 | 179 | 740 | 163 | 100 | 93 | 22 |
| Indian Corn | 30 | 178 | 145 | 512 | 794 | 104 | 81 | 25 |
| Potatoes | 138 | 757 | 579 | 3,687 | 2,648 | 715 | 959 | 173 |
| Total | 1,072 | 3,015 | 2,641 | 11,388 | 6,918 | 1,927 | 2,279 | 396 |

Total number of samples distributed, 29,636.
Number of applicants supplied, 29,592.

Total number of packages of each sort distributed:—

| | |
|---|---|
| Oats | 9,030 |
| Barley | 3,128 |
| Wheat | 4,467 |
| Pease | 1,486 |
| Indian corn | 1,869 |
| Potatoes | 9,656 |
| Total | 29,636 |

The following list shows the number of packages which have been sent out of the different varieties:—

| Name of Variety. | Number of Packages. |
|---|---|
| OATS. | |
| Tartar King | 1,667 |
| Waverley | 1,597 |
| Banner | 1,263 |
| Improved Ligowo | 1,256 |
| Goldfinder | 920 |
| Wide Awake | 902 |
| Abundance | 893 |
| Black Beauty | 532 |
| Total | 9,030 |
| BARLEY. | |
| Mensury | 1,008 |
| Odessa | 752 |
| Rennie's Improved | 673 |
| Sidney | 302 |
| Canadian Thorpe | 210 |
| Standwell | 183 |
| Total | 3,128 |
| WHEAT. | |
| Preston | 967 |
| Percy | 912 |
| Stanley | 874 |
| Red Fife | 840 |
| Wellman's Fife | 750 |
| Emmer (Spelt) | 124 |
| Total | 4,467 |
| PEASE. | |
| Canadian Beauty | 463 |
| Black Eyed Marrowfat | 360 |
| Prussian Blue | 381 |
| Wisconsin Blue | 282 |
| Total | 1,486 |

| Name of Variety. | Number of Packages. |
|---|---|
| INDIAN CORN. | |
| Selected Leaming | 512 |
| Longfellow | 325 |
| Early Mastodon | 321 |
| King of the Earliest | 273 |
| Eureka | 161 |
| North Dakota White | 102 |
| White Cap Yellow Dent | 62 |
| Angel of Midnight | 54 |
| Cloud's Early Yellow | 30 |
| Early Butler | 29 |
| Total | 1,869 |
| POTATOES. | |
| Early Sunrise | 1,303 |
| Early Harvest | 1,117 |
| Carman No. 1 | 994 |
| Everett | 861 |
| Early Andes | 652 |
| Rochester Rose | 593 |
| Maggie Murphy | 582 |
| Surprise | 548 |
| Honeoye Rose | 403 |
| Vigorosa | 379 |
| American Wonder | 319 |
| Early White Prize | 298 |
| Bovee | 275 |
| New Queen | 247 |
| Sir Walter Raleigh | 203 |
| Uncle Sam | 196 |
| Prize Taker | 181 |
| Canadian Beauty | 178 |
| Wonder of the World | 165 |
| Early Rose | 162 |
| Total | 9,656 |

## DISTRIBUTION OF SAMPLES FROM THE BRANCH EXPERIMENTAL FARMS.

Samples of three pounds each were also distributed from the branch experimental farms as follows:—

| | |
|---|---|
| Experimental Farm, Nappan, N.S.— | |
| Oats | 212 |
| Wheat | 68 |
| Barley | 62 |
| Pease | 42 |
| Buckwheat | 16 |
| Winter Rye | 1 |
| Potatoes | 354 |
| Total | 755 |

| | |
|---|---|
| Experimental Farm, Indian Head, N.W.T.— | |
| Oats | 411 |
| Barley | 196 |
| Wheat | 278 |
| Pease | 232 |
| Flax, Rye, &c | 41 |
| Potatoes | 497 |
| Total | 1,655 |

| Experimental Farm, Brandon, Man.— | |
|---|---|
| Samples of grain of all sorts | 161 |
| Potatoes | 241 |
| Total | 402 |

| Experimental Farm, Agassiz, B.C.— | |
|---|---|
| Oats | 163 |
| Barley | 128 |
| Wheat | 217 |
| Pease | 148 |
| Potatoes | 310 |
| Total | 966 |

These samples added to the number distributed by the Central Experimental Farm make a total of 33,413. It is gratifying to find so large an army of co-experimenters willing to engage in this good work.

## TESTS OF THE VITALITY OF SEED GRAIN AND OTHER SEEDS.

The number of samples of seeds tested during the season of 1902-3 to find out the proportion which would germinate was 2,091.

This useful work has been carried on every year since the experimental farms were established. For the first four years the average number of samples tested was 790 per annum, but for the past twelve years the average number has been 2,015 each season. They have consisted largely of samples of cereals, the vitality of which was doubtful owing to bad harvest weather or to some other unfavourable condition. Many samples of timothy, clover and other seeds which farmers buy and want to know whether they were good, have also been sent for test. The total number of samples which have been tested and reported on since this work was begun is 29,451. Farmers are invited to send in every year any samples which may be of doubtful vitality through injury in harvesting or storing or from any other cause, so that their germinating power may be determined and their usefulness for seed purposes ascertained.

Closely associated with this branch of work is the study of the length of time during which grain and seeds of different sorts will hold their vitality. In many instances the decrease in vitality with age is much more rapid than is generally supposed. In 1898, some experiments were begun in this direction by the selection of twelve samples, all vigorous growing sorts and all from the crop of 1897. Each of these samples was placed in a cotton bag and stored on an open shelf, on the shady side of the room in an ordinary office building, midway between the floor and ceiling, where they would get as equal conditions of temperature as could be had. They were kept in this way and tested every year. The samples consisted of three different sorts of wheat, four of oats, two of barley, two of pease, and one of flax-seed. The wheats were samples of Red Fife grown at Indian Head, and Preston and Red Fern, both grown at Ottawa. The oats were Banner, grown at Ottawa and Indian Head, one sample of Prize Cluster, grown at Ottawa, and one sample of Scottish Chief. This was grown at Indian Head.

In wheat the average percentages of vitality for the three varieties taken from the crop of 1897, during the six years' test stand as follows : in 1898, the samples averaged 80 per cent of vitality; in 1899, they averaged 82·3 per cent, a slight increase; in 1900, they dropped to 77·3 per cent; in 1901, to 37 per cent; in 1902, to 15 per cent, and in 1903, to 6 per cent. The average of 6 per cent in 1903 is entirely due to a remnant of vitality of 17 per cent in the Red Fern, the Red Fife and Preston having lost their germinating power entirely. It is evident then that the growing of wheat which has been taken from mummies cannot be true.

In oats the average percentage of vitality for the four samples during the six years' test stood as follows: in 1898, it was 90·2 per cent; in 1899, 93 per cent; in 1900, 78·2 per cent; in 1901, 67 per cent; in 1902, 54 per cent, and in 1903, 29·5 per cent. In no instance have oats entirely lost their vitality during this period. Of barley, two varieties were chosen, one a two-rowed sort known as Canadian Thorpe, grown at Indian Head, and the other, a six-rowed variety, Mensury, grown at Ottawa. The average percentage of vitality of these two barleys during the time they have been under trial has been as follows: 1898, 97 per cent; 1899, 91 per cent; 1900, 78·5 per cent; 1901, 36 per cent; 1902, 19·5 per cent, and in 1903, 7·5 per cent. The two-rowed variety entirely lost its vitality by 1902, while the six-rowed has retained 15 per cent of vitality to the end of the six years' test.

Two varieties of pease were tested, Daniel O'Rourke and Large White Marrowfat. The average percentage of vitality shown by these two varieties was as follows: In 1898, 94 per cent; 1899, 95 per cent; 1900, 88 per cent; 1901, 64 per cent; 1902, 64 per cent, and in 1903, 6 per cent. A sample of flax was also tested, a single example. This gave, in 1898, 81 per cent; 1899, 82 per cent; in 1900, 75 per cent; in 1901, 49 per cent; in 1902, 26 per cent, and in 1903, 24 per cent.

From these tests we gather, that when any of the varieties of grain or seed referred to are kept over for sowing, they may be expected to be about as high in germinating power and in vigour of growth the second year as they were the first. In the third year there is a slight falling off, and in the fourth, fifth and sixth years, a rapid decline in proportion of vitality.

### RESULTS OF TESTS OF SEEDS FOR VITALITY, 1902-03.

| Kind of Seed. | Number of Tests. | Highest Percentage. | Lowest Percentage. | Percentage of Strong Growth. | Percentage of Weak Growth. | Average Vitality. |
|---|---|---|---|---|---|---|
| Wheat | 677 | 100·0 | 26·0 | 83·9 | 3·8 | 87·7 |
| Barley | 359 | 100·0 | 28·0 | 87·6 | 5·4 | 93·0 |
| Oats | 516 | 100·0 | 5·0 | 85·2 | 4·8 | 90·1 |
| Rye | 2 | 82·0 | 81·0 | 77·0 | 4·5 | 81·5 |
| Pease | 126 | 100·0 | 14·0 | .......... | .......... | 79·6 |
| Grass | 106 | 98·0 | 5·0 | .......... | .......... | 78·7 |
| Clover | 207 | 97·0 | 1·0 | .......... | .......... | 70·3 |
| Corn | 4 | 80·0 | 14·0 | .......... | .......... | 43·0 |
| Vetches | 2 | 53·0 | 24·0 | .......... | .......... | 38·5 |
| Beans | 2 | 92·0 | 90·0 | .......... | .......... | 91·0 |
| Onions | 19 | 93·0 | 0·0 | .......... | .......... | 56·4 |
| Celery | 9 | 83·0 | 6·0 | .......... | .......... | 49·5 |
| Carrots | 2 | 27·0 | 4·0 | .......... | .......... | 15·5 |
| Radish | 8 | 80·0 | 39·0 | .......... | .......... | 46·2 |
| Lettuce | 16 | 93·0 | 1·0 | .......... | .......... | 53·5 |
| Cabbage | 7 | 75·0 | 8·0 | .......... | .......... | 44·8 |
| Parsley | 3 | 34·0 | 1·0 | .......... | .......... | 12·3 |
| Tobacco | 2 | 45·0 | 21·0 | .......... | .......... | 33·0 |
| Cauliflower | 3 | 59·0 | 53·0 | .......... | .......... | 56·3 |
| Squash | 2 | 72·0 | 12·0 | .......... | .......... | 42·0 |
| Turnip | 1 | 56·0 | 56·0 | .......... | .......... | 56·0 |
| Spinach | 1 | 9·0 | 9·0 | .......... | .......... | 9·0 |
| Cress | 1 | 38·0 | 38·0 | .......... | .......... | 38·0 |
| Kohl Rabi | 1 | 23·0 | 23·0 | .......... | .......... | 23·0 |
| Leeks | 1 | 64·0 | 64·0 | .......... | .......... | 64·0 |
| Brussels Sprouts | 1 | 20·0 | 20·0 | .......... | .......... | 20·0 |
| Flax | 1 | 60·0 | 60·0 | .......... | .......... | 60·0 |
| Endive | 1 | 29·0 | 29·0 | .......... | .......... | 29·0 |
| Water Cress | 1 | 1·0 | 1·0 | .......... | .......... | 1·0 |
| Parsnips | 1 | 76·0 | 76·0 | .......... | .......... | 76·0 |
| Salsify | 1 | 85·0 | 85·0 | .......... | .......... | 85·0 |
| Beets | 1 | 50·0 | 50·0 | .......... | .......... | 50·0 |
| Rhubarb | 1 | 64·0 | 64·0 | .......... | .......... | 64·0 |
| Mustard | 1 | 59·0 | 59·0 | .......... | .......... | 59·0 |
| Ash Seed | 1 | 16·0 | 16·0 | .......... | .......... | 16·0 |
| Maple Seed | 1 | 4·0 | 4·0 | .......... | .......... | 4·0 |
| Total number of samples tested, highest and lowest percentage. | 2,088 | 100·0 | 0·0 | .......... | .......... | .......... |

TABLE showing Results of Grain Tests for each Province:—

| Kind of Seed. | Number of Tests. | Highest Per-centage. | Lowest Per-centage. | Per-centage of Strong Growth. | Per-centage of Weak Growth. | Average Vitality. |
|---|---|---|---|---|---|---|
| ONTARIO. | | | | | | |
| Wheat | 233 | 100·0 | 26·0 | 77·7 | 4·8 | 82·6 |
| Barley | 125 | 100·0 | 52·0 | 85·7 | 6·5 | 92·2 |
| Oats | 142 | 100·0 | 52·0 | 92·8 | 3·9 | 96·8 |
| QUEBEC. | | | | | | |
| Wheat | 79 | 100·0 | 63·0 | 87·1 | 2·6 | 89·7 |
| Barley | 72 | 100·0 | 28·0 | 86·5 | 5·4 | 91·9 |
| Oats | 64 | 100·0 | 60·0 | 91·8 | 2·8 | 94·6 |
| MANITOBA. | | | | | | |
| Wheat | 62 | 100·0 | 58·0 | 85·0 | 3·7 | 88·7 |
| Barley | 15 | 98·0 | 63·0 | 88·0 | 3·2 | 91·2 |
| Oats | 54 | 100·0 | 5·0 | 76·9 | 5·7 | 82·7 |
| NORTH-WEST TERRITORIES. | | | | | | |
| Wheat | 141 | 100·0 | 39·0 | 84·2 | 4·0 | 88·2 |
| Barley | 65 | 100·0 | 83·0 | 91·6 | 3·1 | 94·8 |
| Oats | 126 | 100·0 | 12·0 | 68·6 | 8·6 | 77·3 |
| NOVA SCOTIA. | | | | | | |
| Wheat | 51 | 100·0 | 60·0 | 88·2 | 3·0 | 91·2 |
| Barley | 52 | 100·0 | 52·0 | 85·0 | 7·8 | 92·5 |
| Oats | 33 | 100·0 | 78·0 | 91·0 | 3·6 | 94·6 |
| NEW BRUNSWICK. | | | | | | |
| Wheat | 61 | 100·0 | 61·0 | 89·9 | 2·7 | 92·7 |
| Barley | 12 | 100·0 | 84·0 | 91·5 | 3·5 | 95·0 |
| Oats | 35 | 100·0 | 89·0 | 93·2 | 2·6 | 95·9 |
| PRINCE EDWARD ISLAND. | | | | | | |
| Wheat | 40 | 100·0 | 82·0 | 93·1 | 2·3 | 95·5 |
| Barley | 18 | 100·0 | 85·0 | 94·9 | 1·6 | 96·5 |
| Oats | 50 | 100·0 | 92·0 | 95·3 | 2·3 | 97·6 |
| BRITISH COLUMBIA. | | | | | | |
| Wheat | 10 | 100·0 | 86·0 | 94·0 | 1·4 | 95·4 |
| Oats | 12 | 100·0 | 79·0 | 88·4 | 4·2 | 92·6 |

(Signed) WILLIAM T. ELLIS.

## METEOROLOGICAL OBSERVATIONS.

TABLE of Meteorological Observations taken at the Central Experimental Farm, Ottawa, 1903; maximum and minimum temperatures, with date of occurrence, and mean temperature for each month, also rainfall and snowfall and total precipitation.

| Month. | Maximum. | Minimum. | Range. | Mean. | Highest. | Date. | Lowest. | Date. | Rainfall. | Snowfall. | Total Precipitation. | Number of days Precipitation. | Heaviest in 24 hours. | Date. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | F° | F° | F° | F° | F° | | F° | | in. | in. | in. | | in. | |
| January... | 20·29 | 2·29 | 17·99 | 11·28 | 38·0 | 30th | —29·8 | 19th | 0·36 | 22·50 | 2·61 | 18 | 0·40 | 11th 21st |
| February.. | 24·62 | 7·95 | 16·66 | 16·28 | 41·8 | 28th | —22·2 | 18th | 1·29 | 27·00 | 3·99 | 16 | 0·60 | 8th |
| March..... | 41·68 | 25·66 | 16·02 | 33·67 | 62·3 | 19th | 0·5 | 3rd | 1·69 | 0 50 | 1·73 | 13 | 0·60 | 23rd |
| April...... | 55·55 | 32·03 | 23·51 | 43·78 | 82·2 | 30th | 14·0 | 5th | 0·85 | 3·00 | 1·15 | 8 | 0·50 | 7th |
| May...... | 74·03 | 43·90 | 30·12 | 58·96 | 90·8 | 19th | 22 5 | 2nd | 0·24 | .... | 0·24 | 8 | 0·09 | 4th |
| June...... | 73·95 | 51·09 | 22·85 | 62·51 | 88·0 | 6th | 41·8 | 1st | 7·30 | ..... | 7·30 | 15 | 2·03 | 12th |
| July..... .. | 77·19 | 58·29 | 18·90 | 67·74 | 89·8 | 8th | 44·5 | 27th | 4·02 | ...... | 4·02 | 17 | 1·40 | 2nd |
| August ... | 71·99 | 51·29 | 20·70 | 61·64 | 81 8 | 22d | 43·6 | 8th | 4·31 | ...... | 4·31 | 18 | 1·39 | 20th |
| September. | 70·78 | 47·52 | 23·26 | 59·15 | 86·8 | 13th | 33·5 | 30th | 2·25 | ...... | 2·25 | 7 | 1·40 | 17th |
| October ... | 57·53 | 38·68 | 18·84 | 48·16 | 70·5 | 1st | 20 5 | 28th | 3·50 | ...... | 3·50 | 15 | 1·05 | 10th |
| November. | 37·63 | 22·35 | 15·27 | 29·98 | 61·0 | 4th | —0·1 | 26th | 0·62 | 4·50 | 1·07 | 11 | 0·33 | 5th |
| December. | 20·40 | 0·84 | 19 55 | 10·61 | 37·0 | 13th | —23·6 | 27th | ...... | 27·50 | 2·75 | 18 | 0·40 | 20th |
| | | | | | | | | | 26·43 | 85·00 | 34·92 | 164 | | |

Rain or snow fell on 164 days during the 12 months.

Heaviest rainfall in 24 hours, 2·03 inches on June 12.

Heaviest snowfall in 24 hours, 6 inches, on February 8.

The highest temperature during the 12 months was 90·8°, on May 19.

The lowest temperature during the 12 months was —29·8°, on January 19.

During the growing season rain fell on 8 days in April, 8 days in May, 15 days in June, 17 days in July, 18 days in August, and 7 days in September.

September shows the lowest number of days with precipitation, viz., 7.

Total precipitation during the 12 months, 34·92 inches, as compared with 36·10 inches during 1902.

Rainfall, Snowfall and Total Precipitation from 1890 to 1903, also the average annual amount that has fallen.

| Year. | Rainfall. | Snowfall. | Total Precipitation. |
|---|---|---|---|
| | In inches. | In inches. | In inches. |
| 1890 | 24·73 | 64·85 | 31·22 |
| 1891 | 30·19 | 73·50 | 37 54 |
| 1892 | 23·78 | 105·00 | 34·28 |
| 1893 | 31·79 | 72·50 | 39·04 |
| 1894 | 23·05 | 71·50 | 30·20 |
| 1895 | 27·01 | 87·50 | 35·76 |
| 1896 | 21·53 | 99·75 | 31·50 |
| 1897 | 24·18 | 89·00 | 33·08 |
| 1898 | 24·75 | 112·25 | 35·97 |
| 1899 | 33·86 | 77·25 | 41·63 |
| 1900 | 29·48 | 108·00 | 40·27 |
| 1901 | 29·21 | 97·25 | 38·91 |
| 1902 | 25·94 | 101 75 | 36·10 |
| 1903 | 26·43 | 85·00 | 34·92 |
| Totals for 14 years | 375·93 | 1,245·10 | 500·42 |
| Yearly average for 14 years | 26·85 | 88·93 | 35·74 |

RECORD of Sunshine at the Central Experimental Farm, Ottawa, for the Years 1898 to 1903.

| MONTHS. | 1898. | | | | 1899. | | | | 1900. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of days with Sunshine. | Number of days without Sunshine. | Total hours Sunshine. | Average Sunshine per Day. | Number of days with Sunshine. | Number of days without Sunshine | Total hours Sunshine. | Average Sunshine per Day. | Number of days with Sunshine. | Number of days without Sunshine | Total hours Sunshine. | Average Sunshine per Day. |
| January | 21 | 10 | 97·4 | 3·14 | 18 | 13 | 91·2 | 2·94 | 18 | 13 | 76·4 | 2·46 |
| February | 15 | 13 | 67·5 | 2·41 | 19 | 9 | 102·1 | 3·64 | 20 | 8 | 110·2 | 3·93 |
| March | 26 | 5 | 171·5 | 5·53 | 17 | 14 | 124·1 | 4·00 | 26 | 5 | 177·9 | 5·73 |
| April | 29 | 1 | 233·8 | 7·79 | 26 | 4 | 228·8 | 7 62 | 26 | 4 | 212·7 | 7·09 |
| May | 30 | 1 | 186·3 | 6·01 | 27 | 4 | 225·4 | 7·27 | 27 | 4 | 241·6 | 7·79 |
| June | 29 | 1 | 184·9 | 6·16 | 29 | 1 | 257·1 | 8·57 | 27 | 3 | 282·2 | 9·40 |
| July | 30 | 1 | 272·8 | 8·80 | 29 | 2 | 271·3 | 8·75 | 29 | 2 | 225·1 | 7·26 |
| *August | .... | .... | ........ | ...... | 31 | 0 | 271·2 | 8 74 | 30 | 1 | 270·7 | 8·73 |
| September | 27 | 3 | 166·9 | 5·23 | 22 | 8 | 128·9 | 4 29 | 22 | 8 | 164·4 | 5·48 |
| October | 21 | 10 | 196·0 | 3·41 | 23 | 8 | 120·4 | 3·88 | 26 | 5 | 148·7 | 4·79 |
| November | 21 | 9 | 91·3 | 3·04 | 17 | 13 | 77·0 | 2·56 | 18 | 12 | 71·7 | 2·39 |
| December | 15 | 16 | 54·3 | 1·75 | 17 | 14 | 50·1 | 1·61 | 16 | 15 | 34·0 | 1·09 |

| MONTHS. | 1901. | | | | 1902. | | | | 1903. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of days with Sunshine. | Number of days without Sunshine | Total hours Sunshine. | Average Sunshine per Day. | Number of days with Sunshine. | Number of days without Sunshine | Total hours Sunshine. | Average Sunshine per Day. | Number of days with Sunshine. | Number of days without Sunshine | Total hours Sunshine. | Average Sunshine per Day. |
| January | 20 | 11 | 94·6 | 3·05 | 21 | 10 | 97·2 | 3·13 | 18 | 13 | 57·5 | 1·85 |
| February | 20 | 8 | 120·9 | 4·31 | 20 | 8 | 93·3 | 3·33 | 19 | 9 | 94·0 | 3·35 |
| March | 19 | 12 | 82·4 | 2·62 | 25 | 6 | 136·2 | 4·39 | 24 | 7 | 121·4 | 3·91 |
| April | 18 | 12 | 137·1 | 4·57 | 26 | 4 | 161·9 | 5·39 | 25 | 5 | 181·7 | 6·05 |
| May | 25 | 6 | 200·8 | 6·47 | 27 | 4 | 229·8 | 7·41 | 31 | 0 | 278·3 | 8·97 |
| June | 29 | 1 | 269·4 | 8·98 | 29 | 1 | 185·6 | 6·18 | 24 | 6 | 157·7 | 5·25 |
| July | 29 | 2 | 245·8 | 7·92 | 31 | 0 | 239·9 | 7·73 | 30 | 1 | 230·1 | 7·42 |
| August | 29 | 2 | 226·1 | 7·29 | 31 | 0 | 252·0 | 8·12 | 25 | 6 | 206·4 | 6·65 |
| September | 26 | 4 | 202·3 | 6·74 | 25 | 5 | 145·0 | 4·83 | 28 | 2 | 174·4 | 5·81 |
| October | 27 | 4 | 126·3 | 4·07 | 24 | 7 | 99·2 | 3·20 | 26 | 5 | 125·9 | 4·06 |
| November | 19 | 11 | 72·4 | 2·41 | 21 | 9 | 82·5 | 2·75 | 23 | 7 | 96·4 | 3·21 |
| December | 16 | 15 | 45·4 | 1·46 | 16 | 15 | 58·4 | 1·88 | 20 | 11 | 53·2 | 1·71 |

* Instruments out of order.

(Sgd.) WILLIAM T. ELLIS,
*Observer.*

## VISIT TO THE EASTERN EXPERIMENTAL FARM.

A visit was paid to the experimental farm at Nappan, N.S., August 3 to 6. The weather was very fine; the hay harvest was then being rapidly pushed and the crop was saved in excellent condition. The severe drought which had prevailed during May and up to June 23 had resulted in a stunted growth in the crops, but after the drought was broken by copious rains they all improved rapidly; the growth of hay thickened considerably at the base and the crop which earlier promised to be almost a failure resulted in about two-thirds of an average yield. The hay produced on the upland was better than that on the marsh.

At the date of my visit the crops in general looked well. In the uniform trial plots of grain the wheat promised about an average yield, the oats and barley above an average. Indian corn was growing well, but was not so far advanced as usual owing to the cold backward season. Turnips were looking remarkably well. A considerable area of additional land had been brought under crop. The dairy cattle were looking well and milking fairly well. The horses, swine, sheep and poultry were all in good condition. Inspection was made of every branch of the work, and the general condition of the farm was very satisfactory and showed evidence of careful supervision. The buildings also and implements were found in good order.

The orchards had made good progress and many of the apple trees were well laden with fruit; the vegetable garden was in a thriving condition, and the flower beds full of bloom. The trees and shrubs planted about the grounds, notwithstanding the drought, had made a satisfactory growth.

## A JOURNEY TO THE WEST.

### THE EXPERIMENTAL FARM AT BRANDON, MAN.

Leaving Ottawa August 14, Brandon was reached on the 16th, where several days were spent in inspecting the buildings and crops and everything was found in excellent order. The field crops promised a good harvest, some of them were already cut and the weather was fine for harvest purposes. Wheat cutting began here on August 17, and subsequently made rapid progress. The different varieties of wheat, oats and barley were carefully examined and notes taken on their growth, condition and character. The oat crop was very heavy. The many varieties of Indian corn, field roots and potatoes under trial here were found to have made strong and healthy growth. When cut green for ensilage, Indian corn subsequently gave, in experimental plots, as high as 28 tons per acre. The heaviest yielding sort of mangel gave over 40 tons per acre. The plots of different varieties of flax were also interesting and promising.

The orchards of cross-bred and seedling crab and apple trees are being rapidly extended and many of the seedlings earlier planted were bearing heavy crops, and some of the cross-bred apples were bearing their first fruits. Many of these are attracting much attention and some progress has been made in propagating and distributing them. Many of the native seedling plums were in fruit and several of the earlier sorts ripened before frost occurred. Some of the earlier ripening sorts of good quality will be propagated. The trees and shrubs forming the Arboretum are doing well, and each season adds to their growth and their number. The Arboretum is now one of the most attractive spots on the farm.

The horses, cattle, swine and poultry were all in good condition and showed evidence of constant and intelligent care.

### EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

This farm was next visited in time to see most of the more important crops before they were harvested. The yields of grain were heavy, especially those of oats. The experimental plots were most remarkable for weight of crop; the heaviest yielder was the Banner, which gave at the rate of 136 bushels 26 pounds per acre. The best twelve varieties in these plots gave the unprecedented average yield of 128 bushels 26 pounds per acre. Barley also gave excellent crops of very plump grain. On the plots one of the two-rowed sorts gave 80 bushels, 40 pounds, and one of the six-rowed varieties at the rate of 71 bushels 12 pounds per acre. Among the highest yielding wheats was the Preston, which gave a crop of 43 bushels 10 pounds per acre. The best field crop was from Huron, one of the cross-bred wheats produced at the experimental farms: this gave 40 bushels 24 pounds per acre.

The cold and backward weather retarded the ripening of the grain and it became necessary to cut some of it before it was fully matured, and most of the grain so treated was more or less shrunken. Several of the late ripening sorts of wheat which were not cut when the frost came on September 5, were touched with frost. Pease were not fully ripened at that time, and consequently most of the varieties were more or less injured. Flax was a fair crop.

Good returns were had from Indian corn cut green for ensilage, field roots also gave very good crops. The yield of potatoes was larger than ever known before, the heaviest crop, that of Carman No. 1, in the experimental plots being at the rate of 711 bushels 28 pounds per acre. The cool season seems to have been favourable to the growth of the potato.

The early ripening varieties of wheat under trial have this year shown themselves relatively earlier than usual. The Preston, which has averaged during the past nine years from four to six days earlier than the Red Fife, was this year from ten to twelve days earlier, and in some instances the advantage in earliness was fully two weeks in favour of Preston. The same may be said of other early ripening sorts. This was no doubt due to the cool and backward weather; the earlier sorts probably having the power of maturing more rapidly under lower temperatures.

In the orchards of Siberian crabs and cross-bred apples, the crab trees were well laden. The fruit makes excellent jelly although it is too small for most other purposes. The cross-bred apple trees, the fruit of which is large enough to be serviceable for domestic use, are young and only beginning to fruit. The trees seem to be equally hardy with those of the crabs. Trees and shrubs for shelter and ornamental purposes have been largely propagated and distributed among settlers all over the Territories, who are using them to advantage and thus making their home surroundings more attractive.

The horses, cattle, swine and poultry were all in good condition and everything in connection with the buildings, implements, &c., was in good order, indicating careful management.

### REGINA AND PRINCE ALBERT DISTRICTS.

After leaving Indian Head, the Regina district was visited, also the country from Regina to Prince Albert. This was during the last week in August and the first in September, at which time the crops were very promising. By September 1 a considerable part of the wheat had been cut and harvesting was progressing rapidly. In Prince Albert several farms were visited, but the grain was not fully matured. At Rosthern the season appeared to be further advanced and a drive of over fifty miles was taken over that district and a number of farmers seen, some of whom had from 100 to 200 acres of wheat. Three years ago very little wheat was brought in at this point and the town had no elevators. Now there are six elevators built and it is said that in 1902 500,000 bushels of wheat were marketed at this point, and it was expected that 600,000 bushels would be brought to Rosthern during the season of 1903.

### EXTENSIVE SETTLEMENT.

Settlement has progressed very rapidly along this line of railway and the homesteads for many miles back have nearly all been taken up. About 60 miles south-east of Rosthern, on the Hoodoo plains towards the Quill lakes a very large tract is being taken up by a body of German Catholics from the United States. In conversation with one of their priests, met at Rosthern, it was learned that about 2,000 of these people had gone into that district this spring, that many more were expected during the autumn, and a still larger number next season. It is expected that this settlement will occupy the greater part of forty to fifty townships. The line of the Canadian Northern Railway now being built will run through this part of the country.

Many of the towns from Regina to Prince Albert have doubled and some of them trebled their population within the past three years, and many new towns have sprung up and are growing rapidly, which at that time had no existence. Twenty-five elevators were counted at different points along this line of railway.

### JOURNEY TO BATTLEFORD.

On returning to Saskatoon, a drive of 200 miles was taken in looking over the country between this point and Battleford. A very large proportion of the land seen was of excellent quality, especially much of that along the proposed line of the Canadian Northern Railway on the north side of the Saskatchewan river.

Arriving at Battleford on the day fixed for the holding of the Annual Agricultural Fair, an opportunity was afforded of seeing a good collection of the agricultural products of that district. The grain shown at that time was not fully ripe, but was fairly well advanced.

### COLONY OF NESTORIANS.

Among other nationalities exhibiting on this occasion were the Nestorians, from Persia, who have taken land within a few miles of the town. They made a very creditable display of vegetables. In an interview with one of their chief men I was told that these people were very well satisfied with this part of Canada and expected a larger influx of settlers from their country next year.

### BARR COLONISTS.

About Saskatoon and along the road to Battleford, also in Battleford itself, many of the Barr colonists were met with. The land chosen for this colony begins about forty miles north-west of Battleford and extends in the same direction to a distance of ninety miles from Battleford, and near that point the town of Lloydminster has been founded. Of the 1,200 people who came out who were entitled to homesteads, about 400 have taken up land in the British settlement. The others have distributed themselves among other settlers all over the country and have taken up homesteads in proximity to places where they could obtain employment. They are engaged in many different lines of work, in the towns, among the farmers, and on the railways. All those we had the opportunity of talking to seemed satisfied with the country, and most of them expected to go on their land to begin their settlement duties next spring.

There is much difficulty in obtaining lumber in many parts of the North-west this year for the many new buildings required. A part of what is used in the Battleford district has been brought in from British Columbia and hauled up from Saskatoon, while a part has been floated donw the north Saskatchewan river, in barges, from Edmonton.

### DOUKHOBOR VILLAGES.

During these journeys opportunity was afforded for visiting several villages of the Doukhobors. Each village consists of a number of houses, one for each family, neatly built with logs and plaster, with, in some instances, an attempt at ornamentation on the plaster work. Their houses are very clean and neat inside, but they appear to have little idea of ventilation, as no provision seems to be made in any of the houses visited for opening the windows. They all have gardens about their houses, in which the leading vegetables are grown. Sunflowers and poppies are also always abundant. Young and old eat quantities of the seeds of both these plants. In the neighbourhood of these villages a large quantity of land was broken and under crop. Belonging to one village was 400 acres of flax, which promised a very good yield. The crop of wheat belonging to the Doukhobors were the poorest seen anywhere and it was evident that their preparation of the land was very crude, although their oat crops were better. They will doubtless soon improve in this particular. The villages visited are now well supplied with cattle and horses. These people are evidently making progress.

### VISIT TO THE EXPERIMENTAL FARM AT AGASSIZ, B.C.

Returning to Regina, the train was taken for Agassiz, B.C., where a week was spent in looking into the many details connected with the experiments in progress there with fruits, cereals and fodder plants. The yields of hay and grain had been heavy, but, owing to wet weather, not much threshing had been done up to that time. The yields of the barley plots, however, had been determined and the best of them ranged from 70 to 80 bushels per acre. The fodder corn was very heavy and almost fit to cut. The root crop, also, was very promising.

The fruit crop at the Agassiz Farm was rather below the average, although some varieties were bearing well. This is the general condition throughout the coast climate and has probably been due to very wet weather in the spring, which prevented the fruit from setting. On Vancouver island, where there was less rain, the crop is much better. Plums have yielded well, but the 'plum rot' has destroyed a considerable proportion of the fruit in the orchards on the mainland. This troublesome pest has proved a discouragement to plum growers in the coast climate. In the drier interior country, fruit trees have yielded abundant crops and there the 'plum rot' causes very little loss.

Among the large number of different sorts of fruits under trial at the experimental farm at Agassiz, while some are of excellent quality, others have proved inferior. These latter are being discarded and a list of them will be published for the information of fruit growers. Selections have been made of those of the highest quality and productiveness—and, in plums, of those most free from rot—for planting in commercial orchards, where instead of having one or two trees, from five to ten trees of each sort are being planted.

A general inspection was made of the field crops, the stock, buildings, &c., and all were found in good condition.

New Westminster and Victoria were also visited and arrangements made for a fine display of the products of the Agassiz Farm at each of the large exhibitions to be held at these points.

### CALGARY AND EDMONTON DISTRICTS.

On the return journey, a few days were spent in looking over the country from Calgary to Edmonton. The progress in settlement all along this line during the past three or four years has been marvellous. Many flourishing towns were seen along the line, some of them only two or three years old. Nearly all the older towns have increased in size and population very much of late. The homesteads are nearly all taken up for from twenty to thirty miles on both sides of the railway and for nearly the whole distance. At Edmonton they are all disposed of for nearly seventy miles east and from thirty-five to forty miles west. Fully 14,000 settlers have gone into the Edmonton district within the past three or four years, a large proportion of whom are

Americans and Galicians. The people who have come in from the United States make excellent settlers and are well trained to the work devolving on new settlers in this western country. The Galicians are making good progress, are fast adapting themselves to the conditions in which they are placed, and are learning English. A number of schools have been established among them.

The town of Edmonton has made phenomenal growth and the prices asked for property there are in some instances more than could be realized in cities in the east with five times the population which Edmonton now has.

Returning, a day was spent at the thriving town of Innisfail, where a drive was taken through a part of that district and some fine farms seen. An opportunity was also afforded of meeting some of the leading farmers of that locality at the prosperous and well equipped creamery which has been established there.

### VISIT TO SOUTHERN ALBERTA.

A trip was made to Macleod, Pincher and Cowley, where some fine fields of fall wheat were seen; also to Lethbridge, and thence to the Mormon settlements south-east of that place, the towns visited being Stirling, Raymond, and Magrath. Each of these places has increased considerably in population during the past year, but the most remarkable growth has been at Raymond. Two years ago I visited the spot on which this town now stands, when a surveyor's tent was the only thing to be seen on the wide expanse of prairie. Now there is a town of about 1,500 inhabitants, possessing a very large brick school, a meeting house, hotel, stores, bank and numerous dwellings.

### BEET SUGAR FACTORY.

There is also an extensive beet sugar factory nearly completed at a cost of about $400,000, which will have a capacity for working up 350 tons of beets a day. This factory is very complete and modern in all its appliances. Some good fields of beets were seen in the neighbourhood, but in many instances the land on which they had been grown had not been sufficiently worked to give the best results. Some of the better fields were expected to give from 10 to 12 tons per acre. The beets grown there are said to be very rich in sugar. The total crop is estimated at from 10,000 to 12,000 tons, which will be sufficient to keep the factory running from thirty to forty days. Another year, under improved conditions, it is expected that a better and larger crop will be produced.

### QUALITY OF WHEAT SEEN AT ELEVATORS.

Returning eastward, some time was spent at Regina, Indian Head, Virden and Brandon. Threshing was being pushed rapidly along and large quantities of wheat were being delivered at the elevators. Most of that being received was grading No. 1 and No. 2 Northern, with an occasional lot of No. 2 Hard. This wheat was coming mainly from the crops grown on stubble land, since they were the earliest to ripen. At all the localities named, excepting Indian Head, the wheat crop was averaging about 20 bushels per acre, and at Indian Head from 20 to 25 bushels. The crops on summer-fallowed land are expected to be heavier; but, since they were later in ripening, they are likely to grade somewhat lower.

The prices being paid this year for wheat grading No. 1 and No. 2 Northern are higher than were paid last season for No. 1 Hard. Hence, the farmers in the wheat growing districts of the North-west country are well satisfied with the results of the season.

Although a few days of wet weather have delayed threshing in some quarters, the quantity of wheat handled by the Canadian Pacific Railway and Canadian Northern Railway from September 14 to October 7, and inspected at Winnipeg, was 4,939 cars, aggregating nearly 5,000,000 bushels, and the fine weather which prevailed at the time of leaving Winnipeg would soon greatly accelerate the moving of the crop.

## ADDITIONS TO THE STAFF.

During the past year a new division of the work has been established known as the 'Division of Cereal Breeding and Experimentation.' In this are included two important branches of work which hitherto have been under the personal charge of the Director. These are the production of new varieties of cereals by cross-breeding and selection and the comparative tests of new and established sorts. The work of general supervision of all the farms now claims so much of the Director's attention that it was not possible for him to give the time necessary to do justice to these special branches. The great grain growing interests of Canada are so important that every effort should be made to improve existing varieties and to produce such new ones as are needed, by judicious crossing, so that varieties may be had suited to the various climatic conditions found in this country. Much good work has already been done which is creditable to the Department and to the Dominion, but the field is a boundless one and the possibilities of improvement are great. The Experimentalist, who has been appointed to take charge of this division is Dr. C. E. Saunders, who has had special training in this direction and has done considerable work in cross-breeding at the Central Farm during the past seven years.

An assistant has also been appointed to the poultry manager, Mr. Victor Fortier, of St. Jérome, Quebec, having been chosen for this position. Mr. Fortier is a man of much experience in poultry matters, and is specially acquainted with the needs of the province of Quebec in connection with her poultry interests. Through Mr. Fortier's energy and his intimate knowledge of poultry breeding and management it is hoped to extend the usefulness of the poultry division.

## PUBLICATIONS ISSUED DURING THE YEAR.

During 1903 three bulletins have been published, No. 41 gave the 'Results obtained in 1902 from trial plots of Grain, Fodder Corn, Field Roots and Potatoes.' This is the eighth bulletin dealing with this subject, prepared by the Director. While dealing primarily with the crops on the experimental plots on all the experimental farms in 1902, it contains also the average results had from the growing of these important farm crops for a series of years. The information thus given has been very useful to the farmers of Canada, showing what varieties have been most productive in different parts of the Dominion.

The second bulletin, No. 42, on 'The Rape Plant, its Culture, use and Value,' was prepared by Mr. J. H. Grisdale, Agriculturist. In this bulletin the usefulness of rape for forage purposes for most classes of stock is demonstrated. The most approved methods of cultivation are given and the cost of growing this crop. Some particulars are also submitted of the results obtained at the Central Experimental Farm in the feeding of this plant to swine and steers.

The third bulletin, No. 43, was on 'Plum Culture, with Descriptions of Varieties,' in which are submitted district lists of plums suitable for Ontario and Quebec. This has been prepared by Mr. W. T. Macoun, Horticulturist, and includes an account of the different classes of plums grown, with some particulars of the experiments which have been carried on with plums at the Central Experimental Farm for many years past. Methods of preparing land for orchard are given, with particulars as to their subsequent planting and care. The methods of propagation of the plum by budding and grafting are referred to and explanations given as to the subsequent pruning and care of the trees; also the spraying of them to control insect enemies and to prevent injuries to which they are liable from various diseases which affect the trees and fruit. Reference is also made to the manner of picking and marketing of the fruit.

### PREPARATIONS FOR THE LOUISIANA PURCHASE EXPOSITION AT ST LOUIS.

From each of the experimental farms contributions of material have been made for the Louisiana Purchase Exposition at St. Louis. These consist of large quantities of grain in the straw, as well as of cleaned grain; also collections of grasses, millets and other fodder plants. Large quantities of fruit and vegetables have been put up in bottles in preserving fluids and forwarded to the exhibition branch of the Department of Agriculture. While all have assisted in every department, the largest contributions to the cereal display have come from the experimental farms at Indian Head, N.W.T., Brandon, Manitoba, and from the Central Experimental Farm at Ottawa. The larger portion of the fruit display has been sent from the experimental farms at Agassiz, B.C., Nappan, N.S., and Ottawa, Ont.

### ACKNOWLEDGMENTS.

I desire to tender grateful acknowledgments to those who have rendered me special service during the past year. To the United States Department of Agriculture for samples of seeds of cereals, fodder crops and vegetables for test from foreign countries. To the Director of the Royal Gardens, Kew, England, for many sorts of seeds of trees, shrubs and plants from Great Britain and abroad. To the Director of the Arnold Arboretum, Jamaica Plains, Mass., for seeds of many different sorts of trees and shrubs of much interest, from foreign countries. To Prof. John Macoun and Mr. J. M. Macoun, both of the Geological and Natural History Survey of Canada, for much practical information and for seeds of rare Canadian plants.

I also tender my best thanks to the officers of the Central and Branch Experimental Farms, for their faithful services and for their earnest co-operation in carrying out the different branches of the work. My sincere thanks are also due to those members of the staff who have rendered me help in those branches of the work of which I have had personal charge; to Mr. John Fixter, the farm foreman, who has taken special charge of the tests made with fertilizers and taken notes thereon, who has also helped me with practical suggestions; to Mr. George Fixter, to whom I am indebted for careful management of the work connected with the distribution of samples of seed grain to the farmers of Canada; and to Mr. Wm. T. Ellis, who has done much careful work in testing the vitality of seeds, the management of the plants in the greenhouse and in the propagation of many useful species for outside decoration. Mr. Ellis has also rendered useful service in the taking of the Meteorological Records.

I am also pleased to bear testimony to the faithful services of my secretary, Mr. Malcolm C. O'Hanly. The employees also of all the farms have my thanks for the interest they have taken in their work, and the care with which they have discharged their respective duties.

WM. SAUNDERS,
*Director of Experimental Farms.*

# REPORT OF THE AGRICULTURIST.

(J. H. Grisdale, B. Agr.)

Dr. Wm. Saunders,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith reports upon the horses, cattle, sheep, swine and farming operations under my supervision during the past year.

As in previous years much of my time has been taken up in attending agricultural and live stock meetings in various parts of Canada.

I have to report a fairly successful year in the different branches of my division and in this connection I wish to acknowledge my indebtedness for assistance and earnest co-operation in their various positions of the farm foreman, Mr. John Fixter, of the herdsman, Mr. Chas. Brettell, and of the dairyman, Mr. J. Meilleur.

From December 1, 1902, to November 30, 1903, 3,003 letters were received and 3,339 despatched by the agricultural division.

I have the honour to be, sir,
Your obedient servant,

J. H. GRISDALE,
*Agriculturist.*

## LIVE STOCK.

The live stock now (Dec. 1, 1903) occupying the different stables and pens under my charge includes horses, cattle, sheep and swine.

### HORSES.

The horses are used for labour exclusively. They number 19, made up of:—

13 heavy draught horses of Clydesdale and Percheron blood.
5 heavy driving horses.
1 light driver.

### CATTLE.

There are representatives of four breeds of cattle, viz.: Shorthorn, Ayrshire, Guernsey and Canadian. There are besides a number of grade cattle and steers.

### *Pure Bred Breeding Cattle.*

The pure bred cattle are as follows:—

11 Shorthorns, including 2 bulls and 9 females.
13 Ayrshires, including 2 bulls and 11 females.
12 Guernseys, including 5 bulls and 7 females.
7 Canadians, including 2 bulls and 5 females.

### GRADE CATTLE.

There are 17 grades, including 5 Shorthorn grades, 5 Ayrshire grades, 6 Guernsey grades and 1 Canadian grade.

### *Steers.*

Sixty-seven steers are now being fed in the barns; this includes:—

15 three-year-olds.
21 two-year-olds.
17 yearlings.
14 calves.

### SHEEP.

Thirty-four head are in the pens, including 20 Shropshires and 14 Leicesters. The Shropshires are:—

4 rams; 1 old and 3 lambs.
16 ewes; 12 old and 4 lambs.

The Leicesters are:—

3 rams; 1 old and 2 lambs.
11 ewes; 8 old and 3 lambs.

### SWINE.

One hundred and eighty-eight pigs of all classes are being fed. This number is made up as follows:—

- 31 Yorkshire, including
  - 12 breeding sows.
  - 2 stock boars.
  - 3 young sows.
  - 8 young boars.
  - 6 sucklings.
- 5 Berkshires, including
  - 4 breeding sows.
  - 1 young sow.
- 6 Tamworths—
  - 3 breeding sows.
  - 3 young sows.
- 4 Large Blacks.
  - 3 breeding sows.
  - 1 boar.
- 142 feeding pigs of various ages and breeds.

## HORSES.

There are 19 horses in the stables. These horses are expected to do the work in the various departments during the year. The work on 'The 200 Acre Farm' is but a part of their duties, about 33⅓ per cent of all the work they perform. They work in addition for the horticultural and experimental departments, as well as upon the lawns and in the Arboretum. In addition a large amount of hauling in connection with the different departments as well as roadmaking and messenger service takes up much of their time.

During the 12 months, December 1, 1902, to November 30, 1903, the 19 horses consumed 145,900 lbs. hay (almost 73 tons), 105,432 lbs. oats, bran and oil meal, and 5,000 lbs. roots.

This food was valued at $1,552.10. To care for them cost $560.00, making a total cost of $2,112.10 for 19 head, or $111.16 to feed and care for one horse for the year, or 37 cents per day, counting 300 working days in the year.

The driver received $1.41⅔ per day, hence 10 hours (day's work) work with a team costs $2.16.

In estimating the cost of horse labour further on in this report $2.50 per day is allowed. This leaves a margin of 32 cents per day for wear and tear on harness and for replacing horses as they grow old. Since the daily allowance of 16 cents per horse amounts to $48 in the year of 300 working days, it is evident that all possible contingencies are amply provided for.

Since the stock of horses is 19 head, and the average working life has been about 10 years, there is allowance made for a sinking fund of $9,120 in the ten years, or sufficient to replace the horses and harness twice over.

## DAIRY CATTLE.

The herd of dairy cattle during 1903 consisted of 38 females, all told. They were:—

| | |
|---|---|
| Canadian grades | 1 |
| Ayrshires | 8 |
| Guernseys | 6 |
| Canadians | 4 |
| Shorthorn grades | 4 |
| Ayrshires grades | 6 |
| Guernsey grades | 5 |
| Canadian grade | 1 |

### FEEDING THE DAIRY CATTLE.

The roughage ration fed to the dairy cows consisted of ensilage, mangels, clover hay and some chaff. The amount of roughage fed varies considerably, since the milch cows vary in weight from 800 lbs. to 1,600 lbs. The approximate roughage ration fed per 1,000 lbs. weight is 35 lbs. corn ensilage, 20 lbs. mangels, 5 lbs. clover hay and a little chaff.

The meal or grain ration fed consisted of different mixtures at different times and to different cows. The meals or grains used were oats, barley, bran, pease, gluten and oil meal. Gluten meal formed the basis of the ration during the winter, while oat chop took its place in summer.

No very heavy grain ration was fed to any cow. A careful study was made of each cow's requirements, and she was fed accordingly.

### SUMMER FEEDING.

The cows were, as usual, pastured during the first summer months on part of the fifth year of the rotation; that is, on land from which one year's hay had been cut. In August and September they were allowed to have the clover meadow aftermath of the fourth year of the rotation. In addition, some soiling crops were fed, and some green corn. The meal ration in the summer was a light one. It consisted of oats and barley ground and fed in proportion to the yield of milk, save in the case of heifers with first calves, when a somewhat heavier ration proportionately was fed.

### COST OF FEEDING.

In estimating the cost of feeding, the following prices were charged for feed stuffs, being the average local market rates for the same during 1902, save in the case of ensilage and roots, which are charged at the usual values affixed in experimental work:—

| | Per month. |
|---|---|
| Pasture | $ 2 per cow |
| Bran | 16 per ton |
| Gluten meal and oil meal | 25 " |
| Oats and barley | 21 " |
| Clover hay | 7 " |
| Chaff | 4 " |
| Roots and ensilage | 2 " |

In estimating the value of the product, 20 cents per pound is allowed for the butter, and 15 cents per hundred pounds for the skim milk and butter milk. The butter is manufactured in the farm dairy and sells on the market at from 22 cents to 30 cents per pound, an average of about 25 cents per pound during the year. This leaves about 5 cents per pound for cost of manufacture.

The following tables give in detail the particulars concerning each cow, herd statements for each of the pure-bred and grade herds, and monthly statements for all the herds combined.

The monthly statements for the whole milking herd show the total yield of milk for each month, its butter fat content, the amount of butter produced, the number of pounds of milk required for a pound of butter, and the average yield of milk per cow per diem. The highest average per cent of fat was recorded in October, and the lowest in February.

In presenting the following 'Herd Reports' some few words of explanation are necessary.

## DAIRY CATTLE REPORTS.

During the year 38 different cows were milked for shorter or longer periods, as indicated on the first page of my report on dairy cattle, whereas in the subjoined 'Herd Reports' only 22 animals are reported upon.

In almost any dairy herd of any size some cows will be found that for some reason have given milk during only a very small part of any given year. Where a large number of cows are being considered one or two such cases introduced in estimating the average does not materially affect the same, but where the herds to be compared are small the consideration of one or two such cases in one herd and no such cases in another makes an unjust difference in favour of the latter herd. To overcome this difficulty as far as possible, the records of three of the best cows in each herd, and of cows that had been in milk for the greater part of the year, have been taken, and the averages estimated from these records, rather than from the records of all cows of that particular breed that happened to calve during the year.

Report 1 is a summary of the more important points in connection with the year's work with the dairy herd.

Report 2 contains the individual records of all cows that gave any milk during the year.

Reports 3, 4, 5, 6, 7, 8, 9 and 10 give the herd records of the several pure bred and grade herds under test.

## REPORT I.

### GENERAL SUMMARY.

| — | November. | December. | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | Totals. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of cows giving milk for month . | 23 | 23 | 22 | 20 | 24 | 28 | 32 | 33 | 30 | 28 | 29 | 29 | |
| Lbs. of milk in month .. | 11,898 | 11,402 | 9,838 | 10,571 | 15,503 | 21,263 | 26,938 | 25,634 | 21,932 | 17,474 | 18,747 | 19,282 | 209,482 |
| Average for 1 day...... | 396·6 | 367·7 | 317·3 | 377·5 | 500·1 | 708·8 | 869 | 854·4 | 707·5 | 563·7 | 624·9 | 622 | 573·9 |
| Daily average per cow. | 17·25 | 16·54 | 15·13 | 21·14 | 23·85 | 26·58 | 26·94 | 25·63 | 23·08 | 19·41 | 20·83 | 20·30 | 21·63 |
| Per cent fat. | 4·32 | 4·36 | 4·35 | 4·08 | 4·29 | 4·29 | 4·29 | 4·26 | 4·24 | 4·22 | 4·31 | 4·40 | 4·30 |
| Lbs. butter fat... ..... | 513·48 | 497·01 | 428·02 | 431·78 | 665·06 | 908·04 | 1154·24 | 1092·31 | 929·35 | 736·63 | 808·92 | 849·10 | 9013·94 |
| Lbs. butter.. | 604·09 | 584·73 | 503·55 | 507·88 | 782·42 | 1068·23 | 1357·71 | 1285·07 | 1093·33 | 866·59 | 951·67 | 998·94 | 10604·21 |
| Lbs. milk for 1 lb. butter. | 19·70 | 19·49 | 19·54 | 20·81 | 19·82 | 19·91 | 19·84 | 19·95 | 20·07 | 20·15 | 19·69 | 19·29 | 19·75 |

# REPORT 2.

## Individual Cow Records.

| Name of Cows. | Age. | Date of dropping last calf. | Number of days in milk. | Daily average yield of milk. | Total milk for year. | Per cent of fat in milk. | Pounds butter produced in year. | Value of butter at 20 cts. per lb. | Value of skim milk at 15 cts. per 100 lbs. | Total value of product. | Amount meal eaten, valued at 1 c. per lb. | Amount of roots and ensilage eaten, valued at $2 per ton. | Amount hay, valued at $7 per ton. | Months on pasture at $2 per month. | Total cost of feed for year. | Cost to produce 100 lbs. milk. | Cost to produce 1 lb. butter, skim milk neglected. | Profit on 1 lb. butter, skim milk neglected. | Profit on cow during year, labour neglected. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Days. | Lbs. | Lbs. | p.c. | Lbs. | $ | $ | $ | Lbs. | Lbs. | Lbs. | Mos. | $ | Cts. | Cts. | Cts. | $ |
| Queenie .........(G.G.) | 5 | Mar. 10, '03 | 290 | 22·8 | 6,629 | 5·93 | 466·57 | 93·31 | 9 24 | 102 55 | 1,468 | 8,430 | 1,815 | 5 | 39 46 | 59·52 | 8·4 | 11·6 | 63 09 |
| Polly............(G.C.) | 8 | Jan. 30, '03 | 325 | 26·13 | 8,493 | 4·55 | 454·24 | 90·84 | 12 04 | 102 88 | 1,712 | 8,290 | 1,815 | 5 | 41 76 | 49·17 | 9·4 | 10·6 | 61 12 |
| Zamora ......... (C.) | 7 | Apr. 18, '03 | 320 | 24·04 | 7,694 | 4·96 | 448·80 | 89·76 | 10 80 | 100 56 | 1,566 | 9,455 | 1,707 | 5 | 41 08 | 53·40 | 9·1 | 10·9 | 59 48 |
| Jessie A........ (A.) | 9 | Feb. 16, '03 | 265 | 35·2 | 9,330 | 3·78 | 415·16 | 83·03 | 13 36 | 96 39 | 1,729 | 8,021 | 1,400 | 5 | 40 21 | 43·09 | 9·60 | 10·40 | 56 18 |
| Laura...........(G.A.) | 6 | Dec. 12, '02 | 324 | 32·3 | 10,490 | 3·25 | 412·80 | 82·56 | 15 10 | 97 66 | 2,058 | 6,790 | 1,630 | 5 | 43 77 | 41·72 | 10·36 | 9·64 | 53 89 |
| Itchen Lady ..... (G.) | 6 | May 2, '03 | 290 | 23·76 | 6,892 | 4·85 | 394·08 | 78·81 | 9 73 | 88 54 | 1,368 | 7,700 | 1,837 | 5 | 37 81 | 54·86 | 9·6 | 10·4 | 50 73 |
| Countess ........(G.A.) | 5 | Feb. 12, '03 | 275 | 31·5 | 8,674 | 3·97 | 405·15 | 81·03 | 12 39 | 93 42 | 1,769 | 9,658 | 1,815 | 5 | 43 69 | 50·36 | 10·70 | 9·30 | 49 73 |
| Bellflower . .....(G.G.) | 5 | Mar. 10, '03 | 285 | 25·7 | 7,339 | 4·48 | 387·03 | 77·40 | 10 42 | 87 82 | 1,484 | 9,910 | 1,815 | 5 | 41 10 | 56·00 | 10·6 | 9·4 | 46 72 |
| Fortune ......... (C.) | 7 | Nov. 30, '02 | 300 | 21·45 | 6,436 | 4·70 | 356·00 | 71·20 | 9 08 | 80 28 | 1,542 | 6,510 | 1,425 | 5 | 36 91 | 57·34 | 10·3 | 9·7 | 43 37 |
| Maggie ........ (A.) | 7 | Apr. 18, '03 | 275 | 27·5 | 7,562 | 3·87 | 344·75 | 68·95 | 10 81 | 79 76 | 1,293 | 8,830 | 1,810 | 5 | 38 09 | 50·37 | 11·04 | 8·96 | 41 67 |
| †Miss Molly..... (S.) | 13 | Sep. 4, '02 | 250 | 25·7 | 6,429 | 4·53 | 330·67 | 66·01 | 9 13 | 75 14 | 1,339 | 8,780 | 1,815 | 3 | 34 69 | 53·96 | 10·5 | 9·5 | 40 45 |
| Marchioness..... (S.) | 9 | Mar. 6, '03 | 300 | 23·9 | 7,182 | 4·14 | 350·14 | 70·03 | 10 25 | 80 28 | 1,641 | 8,800 | 1,815 | 5 | 41 56 | 57·72 | 11·9 | 8·1 | 38 72 |
| Bloomer......... (A.) | 4 | Mar. 31, '03 | 325 | 21·8 | 7,087 | 4·12 | 343·78 | 68·75 | 10 11 | 78 86 | 1,625 | 9,640 | 1,815 | 5 | 42 24 | 59·60 | 12·20 | 7·80 | 36 62 |
| Flossy Lyons ... (G.) | 3 | Feb. 4, '03 | 260 | 19·39 | 5,041 | 5·13 | 304·54 | 60·90 | 9 07 | 67 99 | 1,103 | 6,270 | 1,767 | 5 | 33 48 | 66·41 | 10·9 | 9·1 | 34 51 |
| Denty........... (A.) | 4 | Mar. 29, '03 | 320 | 20·36 | 6,515 | 4·27 | 327·05 | 65·41 | 9 27 | 74 68 | 1,597 | 9,590 | 726 | 5 | 41 91 | 64·3 | 12·8 | 7·2 | 32 77 |
| Exile............ (C.) | 8 | May 10, '03 | 170 | 31·12 | 5,291 | 3·78 | 236·52 | 47·30 | 7 50 | 54 80 | 885 | 1,070 | 682 | 5 | 22 30 | 42 14 | 9·4 | 10·6 | 32 50 |
| Deanie .......... (G.) | 6 | Aug. 21, '03 | 300 | 18·70 | 5,631 | 4·94 | 327·52 | 65·46 | 9 95 | 83 41 | 1,394 | 9,140 | 1,837 | 5 | 41 81 | 73·18 | 12·6 | 7·4 | 32 10 |
| Bloom...........(G.G.) | 9 | May 3, '03 | 290 | 23·05 | 6,682 | 3·96 | 311·65 | 62·33 | 9 55 | 71 88 | 1,218 | 11,310 | 1,922 | 5 | 40 21 | 60·17 | 12·92 | 7·08 | 31 67 |
| Sadie............(G.S.) | 3 | Sep. 11, '03 | 322 | 18·00 | 5,799 | 4·58 | 312·58 | 62·51 | 8 26 | 70 77 | 1,373 | 9,040 | 1,865 | 5 | 39 29 | 67·75 | 12·50 | 7·50 | 31 48 |
| Annie ......... (G.G.) | 3 | Apr. 1, '03 | 214 | 21·63 | 4,629 | 4·22 | 229 72 | 45·93 | 6 60 | 52 55 | 886 | 1,120 | 777 | 5 | 22 71 | 49·06 | 9·8 | 10·2 | 29 84 |
| Flecky ......... (A.) | 4 | Mar. 28, '03 | 291 | 21.64 | 6,299 | 3·97 | 294·24 | 58·84 | 9 00 | 64 84 | 1,498 | 9,270 | 633 | 5 | 39 78 | 63·15 | 13·5 | 6·5 | 28 06 |
| Cherry ......... (G.S.) | 3 | July 18, '03 | 326 | 18·55 | 6,047 | 4·31 | 306·69 | 61·32 | 8 61 | 69 93 | 1,744 | 9,320 | 1,815 | 5 | 43 11 | 71·20 | 14·06 | 5·94 | 26 82 |
| Alma ...........(G.G.) | 2 | Jan. 19, '03 | 284 | 16·33 | 4,638 | 4·73 | 258·78 | 51·75 | 6 57 | 58 32 | 1,252 | 5,160 | 583 | 5 | 32 78 | 70·67 | 12·6 | 7·4 | 25 54 |
| †Honoria........ (G.) | 7 | Oct. 1, '02 | 208 | 21·17 | 4,425 | 4·19 | 229·89 | 45·97 | 6 28 | 52 25 | 1,182 | 9,543 | 720 | ...... | 27·66 | 62·28 | 12·03 | 7·97 | 24 59 |
| Aggie...........(G.G.) | 2 | Apr. 1, '03 | 214 | 17·50 | 3,747 | 4·74 | 209·2 | 41·84 | 5 27 | 47 09 | 886 | 5,040 | 313 | 5 | 22 71 | 60·6 | 10·8 | 9·2 | 24 38 |
| †Darlington Lass. (S.) | 10 | Apr. 10, '03 | 180 | 25·2 | 4,547 | 4·17 | 223·12 | 44·62 | 6 48 | 51 10 | 813 | 11,500 | 1,815 | 1 | 28 15 | 61·90 | 12·6 | 7·4 | 22 95 |
| Alice...........(G.A.) | 2 | Mar. 19, '03 | 220 | 20·2 | 4,449 | 3·76 | 197·16 | 39·43 | 6 37 | 45 80 | 886 | 2,570 | 965 | 5 | 24 80 | 55·74 | 12·60 | 7·40 | 21 00 |
| Gurta .......... (A.) | 3 | .......... | 295 | 18·57 | 5,479 | 3·96 | 255·43 | 51·08 | 7 83 | 58 91 | 1,242 | 9,170 | 726 | 5 | 37 94 | 69·24 | 16 | 4 | 20 97 |
| Alvina ........ (G.A.) | 2 | May 17, '03 | 167 | 24·55 | 3,416 | 4·08 | 164 | 32·80 | 4 87 | 37 67 | 672 | 120 | 93 | 5 | 17 65 | 51·7 | 10·7 | 9·3 | 20 02 |
| Dora............(G.A.) | 11 | Mar. 8, '03 | 295 | 22·55 | 6,645 | 3·21 | 251·01 | 50·20 | 9 58 | 59 78 | 1,656 | 8,840 | 726 | 5 | 41 75 | 62 84 | 16·6 | 3·4 | 18 03 |
| Rosy ...........(G.S.) | 4 | Oct. 5, '03 | 304 | 18·47 | 5,615 | 3·8 | 251·64 | 50·32 | 8 04 | 58 36 | 1,448 | 9,590 | 746 | 5 | 40 59 | 72·29 | 16·1 | 3·9 | 17 77 |
| Amy............(G.A.) | 2 | May 18, '03 | 165 | 18·54 | 2,960 | 4·28 | 148·58 | 29·71 | 4 21 | 33 92 | 660 | 120 | 93 | 5 | 17 53 | 59·22 | 11·8 | 8·2 | 16 39 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ruby ........... (G.) | 6 | Oct. 5,'03 | 283 | 14·93 | 4,226 | 5·68 | 271·11 | 54·22 | 5 92 | 60 14 | 1,310 | 9,685 | 735 | 5 | 49 24 | $1·16 | 18·1 | 1·9 | 10 93 |
| Denise Reine .... (C.) | 3 | ......... | 259 | 10·09 | 2,615 | 4·83 | 148·7 | 29·74 | 3 68 | 33 42 | 831 | 5,390 | 534 | 5 | 28 35 | $1·07 | 19 | 1 | 5 07 |
| Clatford Spot.... (G.) | 9 | Jun. 11,'03 | 304 | 12·12 | 3,687 | 4·5 | 199·56 | 39·91 | 5 22 | 42 32 | 1,617 | 9,723 | 735 | 5 | 42 32 | $1·14 | 21·2 | ........ | 2 81 |
| Illuminata. .... (S.) | 4 | Mar.21,'03 | 286 | 9·6 | 2,752 | 4·26 | 138·65 | 27·61 | 3 91 | 31 52 | 926 | 8,645 | 726 | 5 | 34 25 | $1·24 | 24·08 | ........ | *2 73 |
| †Norah's Last.... (A.) | 9 | Mar.20,'03 | 92 | 6·65 | 612 | 4·15 | 29·91 | 5·98 | 0 87 | 6 85 | 289 | 6,820 | 360 | ..... | 12 86 | $2·10 | 43 | ........ | *6 01 |

†Dead.

*Loss.

SHORTHORNS.

| Names of Cows. | Age. | Date of dropping last calf. | Number of days in milk in 1903. | Daily average yield of milk. | Total milk for year. | Per cent of fat in milk. | Pounds of butter produced in year. | Value of butter at 20c. per lb. | Value of skim milk at 15c. per 100 lbs. | Total value of products. | Amount meal eaten. | Amount of roots and ensilage eaten, valued at $2 per ton | Amount hay, Valued at $7 per ton. | Months on pasture. | Total cost of feed for year. | Costs to produce 100 lbs. of milk. | Cost to produce 1 lb. butter, skim milk neglected. | Profit on 1 lb. butter, skim milk neglected. | Profit on cow during year, labour neglected. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Days. | Lbs. | Lbs. | p. c. | Lbs. | $ cts. | $ cts. | $ cts. | Lbs. | Lbs. | Lbs. | Mos | $ cts. | Cts. | Cts. | Cts. | $ cts. |
| Marchioness.. .......... | 9 | Mar. 6, 03 | 300 | 23·9 | 7,182 | 4·14 | 350·14 | 70 03 | 10 25 | 80 28 | 1,641 | 8,800 | 1,815 | 5 | 41 56 | 57·72 | 11·9 | 8·1 | 38 72 |
| Miss Molly.............. | 13 | Sept. 4, 02 | 250 | 25·7 | 6,429 | 4·53 | 330·07 | 66 01 | 9 13 | 75 14 | 1,339 | 8,780 | 1,815 | 3 | 34 69 | 53·96 | 10·5 | 9·5 | 40 45 |
| Darlington Lass.......... | 10 | Apr. 10, 03 | 180 | 25·2 | 4,547 | 4·17 | 223·12 | 44 62 | 6 48 | 51 10 | 813 | 11,500 | 1,815 | 1 | 28 15 | 61·90 | 12.6 | 7·4 | 22 95 |
| Average. . ......... | .... | .......... | 243 | 24·9 | 6,053 | 4·22 | 301·11 | 60 22 | 8 62 | 68 84 | 1,294 | 9,693 | 1,815 | 3 | 34 80 | 57·49 | 11·56 | 8·44 | 34 04 |
| AYRSHIRES. | | | | | | | | | | | | | | | | | | | |
| Jessie A................ | 9 | Feb. 16, 03 | 265 | 35·2 | 9,330 | 3·78 | 415·16 | 83 03 | 13 36 | 96 39 | 1,729 | 8,021 | 1,406 | 5 | 40 21 | 43·09 | 9·60 | 10·40 | 56 18 |
| Maggie..... .. ......... | 7 | Apr. 18, 03 | 275 | 27·5 | 7,562 | 3·87 | 344·75 | 68 95 | 10 81 | 79 76 | 1,293 | 8,830 | 1,810 | 5 | 38 09 | 50·37 | 11·04 | 8·96 | 41 67 |
| Bloomer. ..... .... ... | 4 | Mar. 31, 03 | 325 | 21·8 | 7,087 | 4·12 | 343·78 | 68 75 | 10 11 | 78 86 | 1,625 | 9,640 | 1,815 | 5 | 42 24 | 59·60 | 12·20 | 7·80 | 36 62 |
| Average. ........... | .... | .......... | 288 | 27·7 | 7,993 | 3·91 | 367·89 | 73 57 | 11 42 | 85 00 | 1,549 | 8,830 | 1,675 | 5 | 40 18 | 50·26 | 10·92 | 9·08 | 44 82 |
| GUERNSEYS. | | | | | | | | | | | | | | | | | | | |
| Itchen Lady............ | 6 | May 2, 03 | 290 | 23·76 | 6,892 | 4·85 | 394·08 | 78 81 | 9 73 | 88 54 | 1,368 | 7,700 | 1,837 | 5 | 37 81 | 54·86 | 9·6 | 10·4 | 50 73 |
| Deanie................. | 6 | Aug.21, 03 | 300 | 18·70 | 5,631 | 4·94 | 327·32 | 65 46 | 7 95 | 73 41 | 1,574 | 9,140 | 1,837 | 5 | 41 31 | 73·18 | 12 6 | 7·4 | 32 10 |
| *Flossy Lyons......... . | 3 | Feb. 4, 03 | 260 | 19·39 | 5,041 | 5·13 | 304·54 | 60 50 | 7 09 | 67 99 | 1,103 | 6,270 | 1,767 | 5 | 33 48 | 66·41 | 10·9 | 9·1 | 34 51 |
| Average... ......... | .... | .......... | 283 | 20·7 | 5,855 | 4·96 | 341·98 | 68 39 | 8 25 | 76 64 | 1,348 | 7,702 | 1,813 | 5 | 37 53 | 64·09 | 10·9 | 9·1 | 42 45 |

* Flossy Lyons calved for first time in February, 1903.

## CANADIANS.

| Names of Cows. | Age. | Date of Dropping last calf. | Number of days in milk in 1903. | Daily average yield of milk. | Total milk for year. | Per cent of fat in milk. | Pounds of butter produced in year. | Value of butter at 20c. per lb. | Value of skim milk at 15c. per 100 lbs. | Total value of products. | Amount meal eaten. | Amount of roots and ensilage eaten valued at $2 per ton. | Amount hay valued at $7 per ton. | Months on pasture. | Total cost of feed for year. | Cost to produce 100 lbs. milk. | Cost to produce 1 lb. butter, skim milk neglected. | Profit on 1 lb. butter, skim milk neglected. | Profit on cow during year, cost of labour not included. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Days. | Lbs. | Lbs. | p. c. | Lbs. | $ cts. | $ cts. | $ cts. | Lbs. | Lbs. | Lbs. | Mos | $ cts. | Cts. | Cts. | Cts. | $ cts. |
| Zamora | 7 | Apr. 18,'03 | 320 | 24·04 | 7,694 | 4·96 | 448·80 | 89 76 | 10·80 | 100·56 | 1,566 | 9,455 | 1,707 | 5 | 41 08 | 53·40 | 9·1 | 10·9 | 59·48 |
| Fortune | 7 | May 10,'03 | 300 | 21·45 | 6,436 | 4·70 | 356·00 | 71 20 | 9·08 | 80·28 | 1,542 | 6,510 | 1,425 | 5 | 36 91 | 57·34 | 10·3 | 9·7 | 43·37 |
| * Exilee | 8 | Nov.30,'02 | 170 | 31·12 | 5,291 | 3·78 | 236·52 | 47 30 | 7·50 | 54·80 | 885 | 1,070 | 682 | 5 | 22 30 | 42·14 | 9·4 | 10·6 | 32·50 |
| Average | ... | ... | 263 | 24·48 | 6,440 | 4·58 | 347·10 | 69 42 | 9·12 | 78·54 | 1,331 | 5,678 | 1,271 | 5 | 33 43 | 51·90 | 9·6 | 10·4 | 45·12 |

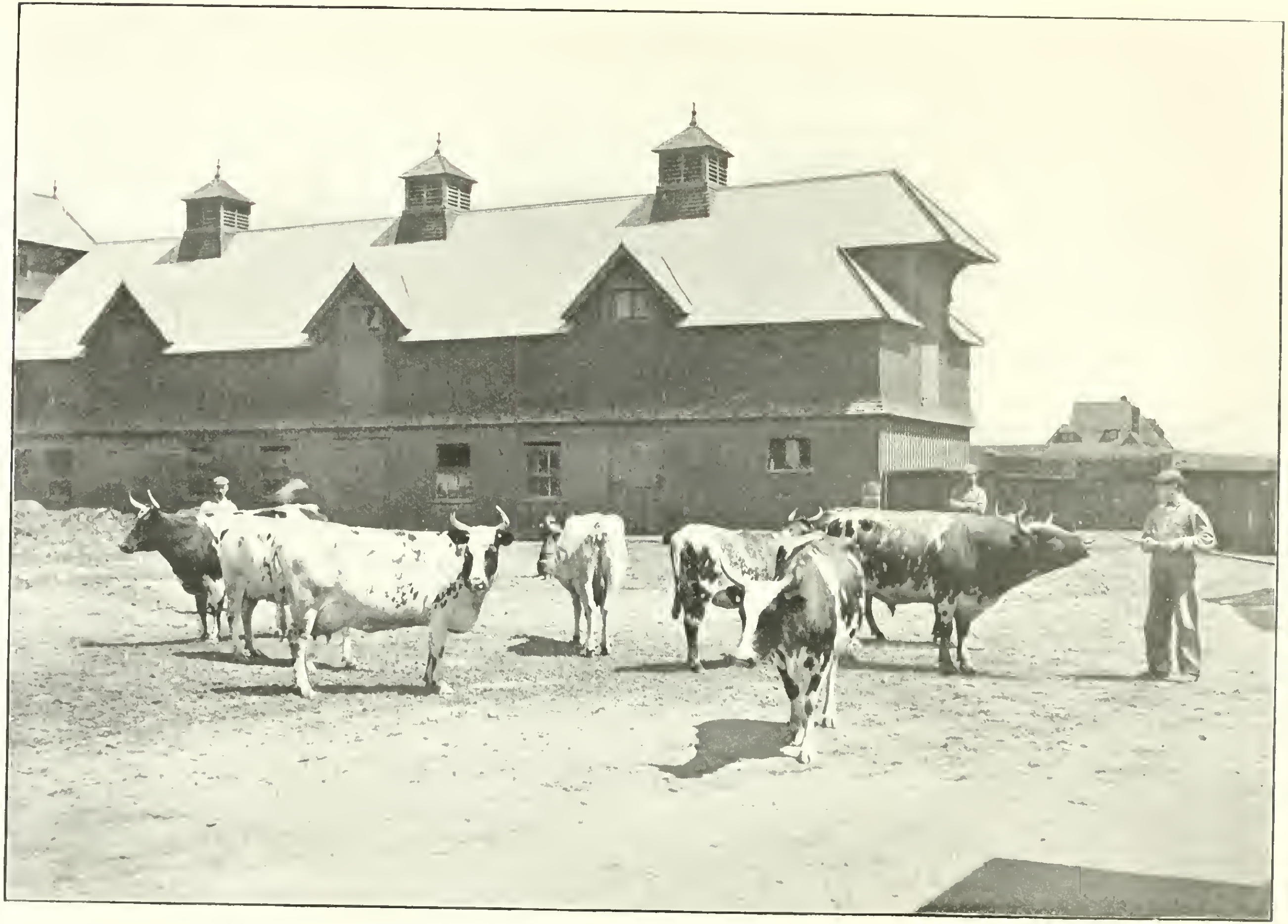
* Exilee was purchased in March and gave no milk till May 10, 1903, when she calved.

## SHORTHORN GRADES.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bloom | 9 | May 3,'03 | 290 | 23·05 | 66·82 | 3·96 | 311·65 | 62 33 | 9 55 | 71 88 | 1,218 | 11,310 | 1,922 | 5 | 40 21 | 60·17 | 12·92 | 7·08 | 31·67 |
| Sadie | 3 | Sept.11,'03 | 322 | 18·00 | 57·99 | 4·58 | 312·58 | 62 51 | 8 26 | 70 77 | 1,373 | 9,040 | 1,865 | 5 | 39 29 | 67·75 | 12·50 | 7·50 | 31·48 |
| Cherry | 3 | July 18,'03 | 326 | 18·55 | 60·47 | 4·31 | 306·60 | 61 32 | 8 61 | 69 93 | 1,744 | 9,320 | 1,815 | 5 | 43 11 | 71·20 | 14·06 | 5·94 | 26·82 |
| Average | ... | ... | 312 | 19·79 | 61·76 | 4·27 | 310·27 | 62 05 | 8 80 | 70 86 | 1,445 | 9,890 | 1,867 | 5 | 40 87 | 66·15 | 13·17 | 6·83 | 29·99 |

## AYRSHIRE GRADES.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laura | 6 | Dec. 12,'02 | 324 | 32·3 | 10,490 | 3·35 | 412·80 | 82·56 | 15 10 | 97 66 | 2,058 | 6,790 | 1,630 | 5 | 43 77 | 41·72 | 10·36 | 9·64 | 53·89 |
| Countess | 5 | Feb. 12,'03 | 275 | 31·5 | 8,674 | 3·97 | 405·15 | 81·03 | 12 39 | 93 42 | 1,769 | 9,658 | 1,815 | 5 | 43 69 | 50·36 | 10·70 | 9·30 | 49·73 |
| Alice | 2 | Mar.19,'03 | 220 | 20·2 | 4,449 | 3·76 | 197·16 | 39·43 | 6 37 | 45 80 | 886 | 2,570 | 965 | 5 | 24 80 | 55·74 | 12·60 | 7·40 | 21·00 |
| Average | ... | ... | 273 | 28·8 | 7,871 | 3·65 | 338·37 | 67·67 | 11 28 | 78 96 | 1,571 | 6,339 | 1,470 | 5 | 37 43 | 47·54 | 11·05 | 8·95 | 41·54 |



Imported Ayrshire Herd at Central Experimental Farm.

## GUERNSEY GRADES.

| Names of Cows. | Age. | Date of dropping last calf. | Number of days in milk in 1903. | Daily average yield of milk. | Total milk for year. | Per cent of fat in milk. | Pounds of butter produced in year. | Value of butter at 20c. per lb. | Value of skim milk at 15c. per 100 lbs. | Total value of products. | Amount meal eaten. | Amount of roots and ensilage eaten, valued at $2 per ton. | Amount hay, valued at $7 per ton. | Months on pasture. | Total cost of feed for year. | Cost to produce 100 lbs. of milk. | Cost to produce 1 lb. butter, skim milk neglected. | Profit on 1 lb. butter, skim milk neglected. | Profit on cow during year, labour neglected. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Days. | Lbs. | Lbs. | p.c. | Lbs. | $ cts. | $ cts. | $ cts. | Lbs. | Lbs. | Lbs. | Mos | $ cts. | Cts. | Cts. | Cts. | $ cts. |
| Queenie.... .... ...... | 5 | Mar. 10, 03 | 290 | 22·8 | 6,629 | 5·93 | 466·57 | 93 31 | 9 24 | 102 55 | 1,468 | 8,430 | 1,815 | 5 | 39 46 | 59·52 | 8·4 | 11·6 | 63·09 |
| Bellflower. . .. ........ | 5 | Mar. 10, 03 | 285 | 25·7 | 7,339 | 4 48 | 387·03 | 77 40 | 10 42 | 87 82 | 1,481 | 9,910 | 1,815 | 5 | 41 10 | 56 00 | 10·6 | 9·4 | 46·72 |
| * Annie .. .............. | 3 | Apr. 1, 03 | 214 | 21·63 | 4,629 | 4·22 | 229·72 | 45 95 | 6 60 | 52 55 | 886 | 1,120 | 777 | 5 | 22 71 | 49·06 | 9·8 | 10·2 | 29·84 |
| Average............ | .... | .......... | 263 | 23·2 | 6,199 | 4·95 | 361·11 | 72 22 | 8 75 | 80 97 | 1,279 | 6,153 | 1,369 | 5 | 34 42 | 55·51 | 9·5 | 10·5 | 46·55 |

* Annie calved for first time April 1, 1903.

## CANADIAN GRADE.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Polly ..... | 8 | Jan. 30, 05 | 325 | 26·13 | 8,193 | 4·55 | 451 24 | 90 84 | 12 04 | 102 88 | 1,712 | 8,290 | 1,815 | 5 | 41·76 | 49 17 | 9·4 | 10·6 | 61·12 |

### DAILY RECORDS.

The effort to interest dairymen in the returns from their individual cows has been continued, and many farmers seem to be awakening to a knowledge of the fact that the improvement of the whole herd demands the study of the unit; that is, a close acquaintance with the expenditure upon the individual cow and the returns from the same.

This can be determined in no other way than by keeping an exact record of the daily milk yield and the daily food consumption.

Forms, similar to the following, for keeping a record of the milk yield are still supplied free on application.

### DAILY MILK RECORD.

Herd belonging to ..................
Post Office ..................
Record for week ending..................

(This form supplied free by Live Stock Division, Central Experimental Farm, Ottawa, Ont.)

COWS.

| Day. | Time. | | | | | | | | | | | | | | | | | Total for Day. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sunday | Morning | | | | | | | | | | | | | | | | | |
| | Evening | | | | | | | | | | | | | | | | | |
| Monday | Morning | | | | | | | | | | | | | | | | | |
| | Evening | | | | | | | | | | | | | | | | | |
| Tuesday | Morning | | | | | | | | | | | | | | | | | |
| | Evening | | | | | | | | | | | | | | | | | |
| Wednesday | Morning | | | | | | | | | | | | | | | | | |
| | Evening | | | | | | | | | | | | | | | | | |
| Thursday | Morning | | | | | | | | | | | | | | | | | |
| | Evening | | | | | | | | | | | | | | | | | |
| Friday | Morning | | | | | | | | | | | | | | | | | |
| | Evening | | | | | | | | | | | | | | | | | |
| Saturday | Morning | | | | | | | | | | | | | | | | | |
| | Evening | | | | | | | | | | | | | | | | | |
| Total | Week | | | | | | | | | | | | | | | | | |

(Reverse.)

## CENTRAL EXPERIMENTAL FARM.

WM. SAUNDERS, *Director.* J. H. GRISDALE, *Live Stock and Agriculture.*

### MILK RECORDS.

1. The profitable dairy cow must give over 5,000 pounds of milk each year. To know the value of a cow her total annual yield of milk must be known. The only way to know this is to keep a record of her daily milk yield.

2. The form on the other side of this sheet is intended to help progressive dairy farmers by supplying them with a simple and convenient sheet for the keeping of the milk records of their individual cows. A study of such records will soon indicate which cows should go to the butcher. We would be pleased to receive a summary of your record. If you have no summary forms write us.

3. Such records are being kept by hundreds of successful dairymen to-day. Many of these men attribute their success to the keeping of such records. Why not give the thing a trial if you are a dairyman ? It will increase your milk product. It will lighten your labour, since your interest will be increased in your work, and 'interest lightens

labour.' It will show you the unprofitable cow the 'boarder.' You cannot get rid of her too quickly.

4. For weighing the milk a simple spring balance may be secured for from one to three dollars. If your local dealer cannot supply you, write the undersigned for particulars. A small platform scale is fairly convenient, but we find the spring balance preferable.

5. Many farmers keep records of the amount of food fed to individual cows. If you would like to do so, sample forms would be sent free on writing J. H. Grisdale, Agriculturist, Central Exeprimental Farm, Ottawa, Ont.

## BEEF PRODUCTION.

### EXPERIMENTS IN 1902-3.

The experiments in the winter of 1902-3 have been similar to those in 1901-2. The prices charged for feeds are the same as those mentioned in connection with feeding dairy cows.

It will be observed that in every case where steers were bought in for feeding purposes in 1902-3 there was a loss. In 1901-2 the difference between the cost price when steers were bought in for feeding in the fall and the selling price when they were sold out fat the next spring was nearly double the cost of the feed required to fatten them. In 1902-3 the difference between the buying price and the selling price falls short of the cost of feed at the prices charged.

As stated in my report for 1902, such favourable conditions as maintained in 1901-2 for the beef producer seldom occur. I think I may just as safely say now that such disastrous years as 1902-3 for the feeder are seldom seen. Throughout Canada and the United States cattle bought in the fall of 1902 for feeding left a very small margin to pay for feed and care. Judging by the prices paid for feeding cattle and the market prices for prime beef in the spring, I am certain that an average of $15 per head increase in value is the outside. Such a sum is considerably short of sufficient to pay all expenses let alone leave any profit.

Of course, it must not be forgotten that a large part of the food consumed would be roughage of such a character that it could not be sold off the farm, and, in addition, the manure obtained from cattle fed would be a most valuable and really indispensable by-product of all such feeding operations.

### LOOSE *VS.* TIED.

The feeding of steers loose as contrasted with similar steers fed tied has been continued during the past year, and, as was the case last year, the scope of the experiment slightly enlarged to include the comparison of steers fed loose allowed a large area of floor space with similar steers fed loose allowed a more limited area of floor space.

The steers fed tied occupied 56 square feet of floor space each; one lot fed loose occupied 84 square feet of floor space for each steer, while another lot fed loose occupied only 38 square feet of floor space for each steer.

In 1901-2 both lots fed loose made greater and more economical gains that did the lot fed tied, the lot having the smaller floor space making the greatest gains of the three.

To compare :—

### LOTS FED IN 1902-3.

Lot 1.—Tied, 9 steers, 56 sq. ft. per steer, average gain, 284 pounds in 180 days, or 1·58 pounds per steer per day.

Lot 2.—Loose, 9 steers, 84 sq. ft. per steer, average gain, 337 pounds in 180 days, or 1·87 pounds per steer per day.

Lot 3.—Loose, 9 steers, 38 sq. ft. per steer, average gain 274 pounds in 180 days, or 1·52 pounds per steer per day.

A combining of the results of 1902 with those of 1903 shows a somewhat different standing, as follows:—

Lot 1.—Tied, 9 steers, 56 sq. ft. per steer, average gain 591 pounds in 366 days, or 1·62 pounds per steer per day.

Lot 2.—Loose, 9 steers, 84 sq. ft. per steer, average gain, 666 pounds in 366 days, or 1·82 pounds per steer per day.

Lot 3.—Loose, 9 steers, 38 sq. ft. per steer, average gain, 619 pounds in 366 days, or 1·69 pounds per steer per day.

Below are detailed statements of the different lots discussed, which were fed in the winter of 1902-3.

## LOT 'A.'

### TIED (3 YEARS OLD, NOT DEHORNED).

*Each steer occupied 56 square feet floor space.*

| | | |
|---|---|---|
| Number of steers in lot | 9 | |
| First weight gross | 11,420 | lbs. |
| First weight average | 1,269 | " |
| Finished weight gross | 13,980 | " |
| Finished weight average | 1,553 | " |
| Total gain in 180 days | 2,560 | " |
| Average gain per steer | 284 | " |
| Daily gain for lot, 9 steers | 14·22 | " |
| Daily gain per steer | 1·58 | " |
| Gross cost of feed | $180 69 | |
| Cost of 100 pounds gain | 7 05 | |
| Cost of steers, 11,420 lbs. at $4.90 per 100 lbs. | 559 58 | |
| Total cost to produce beef, $559.58+$180.69 | 740 27 | |
| Sold, 13,980 lbs. at $5.25 per 100 lbs., less 5 per cent | 697 25 | |
| *Loss on lot | 43 02 | |
| Net loss per steer | 4 78 | |
| Average buying price per steer | 62 17 | |
| Average selling price per steer | 77 47 | |
| Average increase in value | 15 30 | |
| Average cost of feed per steer | 20 08 | |
| Amount of meal (Gluten meal) eaten by lot of 9 steers | 4,815 | lbs. |
| Amount of ensilage and roots | 90,719 | " |
| Amount of hay | 8,514 | " |

## LOT 'B.'

### LOOSE (3 YEARS OLD, DEHORNED.)

*Each steer allowed 84 feet floor space.*

| | | |
|---|---|---|
| Number of steers in lot | 9 | |
| First weight gross | 8,950 | lbs. |
| First weight average | 994 | " |
| Finished weight gross | 11,985 | " |

| | | |
|---|---|---|
| Finished weight average | 1,331 | " |
| Total gain in 180 days | 3,035 | " |
| Average gain per steer | 337 | " |
| Daily gain for lot, 9 steers | 16·86 | " |
| Daily gain per steer | 1·87 | " |
| Gross cost of feed | $161 62 | |
| Cost of 100 lbs. gain | 5 32 | |
| Cost of steers, 8,950 lbs. at $4.90 per 100 lbs, | 438 55 | |
| Total cost to produce beef, $438.55+$161.52 | 600 17 | |
| Sold, 11,985 lbs. at $5.25 per 100 lbs., less 5 per cent | 577 77 | |
| *Loss on lot | 22 40 | |
| Net loss per steer | 2 49 | |
| Average buying price per steer | 48 73 | |
| Average selling price per steer | 64 19 | |
| Average increase in value | 15 46 | |
| Average cost of feed per steer | 17 95 | |
| Amount of meal (Gluten meal) eaten by lot of 9 steers | 4,086 | lbs. |
| Amount of ensilage and roots | 81,537 | " |
| Amount of hay | 8,239 | " |

## LOT 'C.'

### LOOSE (3 YEARS OLD, DEHORNED).

*Each steer allowed 38 square feet floor space.*

| | | |
|---|---|---|
| Number of steers in lot | 9 | |
| First weight gross | 8,955 | lbs. |
| First weight average | 995 | " |
| Finished weight average | 1,269 | " |
| Finished weight gross | 11,425 | " |
| Total gain in 180 days | 2,471 | " |
| Average gain per steer | 274 | " |
| Daily gain for lot, 9 steers | 13·73 | " |
| Daily gain per steer | 1·52 | " |
| Gross cost of feed | $161 62 | |
| Cost of 100 pounds gain | 6 58 | |
| Cost of steers, 8,955 lbs. at $4.90 per 100 lbs. | 438 79 | |
| Total cost to produce beef, $438.79+$161.62 | 600 41 | |
| Sold, 11,425 lbs. at $5.25 per 100 lbs., less 5 per cent | 569 34 | |
| *Loss on lot | 31 07 | |
| Net loss per steer | 3 45 | |
| Average buying price per steer | 48 75 | |
| Average selling price per steer | 63 26 | |
| Average increase in value | 14 51 | |
| Average cost of feed per steer | 17 95 | |
| Amount of meal (Gluten meal) eaten by lot of 9 steers | 4,086 | lbs. |
| Amount of ensilage and roots | 81,537 | " |
| Amount of hay | 8,239 | " |

*In each case where a loss is apparent, it is understood that had all foods been bought at prices indicated then there would have been an actual loss. In the case of lot 'A' for instance, where a loss of $43.02 on 9 steers, or $4.78 on each steer of the lot is indicated, the actual money outlay was $60.19, the balance of the estimated cost of feeding the 9 steers being the value placed upon the ensilage or roots and the hay.

## INFLUENCE OF AGE ON COST OF BEEF.

### COST OF PRODUCING BEEF WITH

*Three-year-olds, Two-year-olds, Yearlings, Six Months' Calves and New-born Calves.*

The experiments to gain some data as to the influence of age upon the cost of producing a pound of beef have been continued.

Lots of animals of as nearly uniform type and breeding as possible were selected and fed such rations as were found to suit them best. The roughage ration in each case consisted of roots, ensilage and hay, the concentrates fed to 3-year-olds, 2-year-olds, and yearlings was gluten meal. The calves were fed a meal ration made up of oats, pease, barley, oil meal and gluten mixed in different proportions at different periods.

Full statements of the particulars in connection with each lot will be found below. A few of the more important particulars are grouped for comparison as follows:—

| Ages. | Daily Gain. | Gain in 180 days. | Cost 100 lbs. Gain. |
|---|---|---|---|
| | Lbs. | Lbs. | $ |
| Three Year Olds | 1·58 | 284 | 7.05 |
| Two Year Olds | 1·65 | 298 | 6.03 |
| Yearlings | 1·65 | 298 | 5.54 |
| Six Month Calves | 1·46 | 263 | 5.33 |
| Skim Milk Calves, New Born | 1·48 | 273 | 2.16 |

In cost of production there is a quite remarkable gradation in favour of the younger classes.

### LOT 'D'—THREE-YEAR-OLDS.

| | | |
|---|---|---|
| Number of steers in lot | 9 | |
| First weight, gross | 11.420 | lbs. |
| First weight, average | 1,269 | " |
| Finished weight, gross | 13,980 | " |
| Finished weight, average | 1,553 | " |
| Total gain in 180 days | 2,560 | " |
| Average gain per steer | 284 | " |
| Daily gain for lot, 9 steers | 14·22 | " |
| Daily gain per steer | 1·58 | " |
| Gross cost of feed | $ 180 69 | |
| Cost of 100 pounds gain | 7 05 | |
| Cost of steers, 11,420 lbs. at $4.90 per 100 lbs | 559 58 | |
| Total cost to produce beef, $559.58 + $180.69 | 740 27 | |
| Sold, 13,980 lbs. at $5.25 per 100 lbs., less 5 per cent | 697 25 | |
| Loss on lot | 43 02 | |
| Net loss per steer | 4 78 | |
| Average buying price per steer | 62 17 | |
| Average selling price per steer | 77 47 | |
| Average increase in value | 15 30 | |
| Average cost of feed per steer | 20 08 | |

| | | |
|---|---|---|
| Amount of meal (gluten meal) eaten by lot of 9 steers | 4,815 | lbs. |
| Amount of ensilage and roots | 90,719 | “ |
| Amount of hay | 8,514 | “ |

### LOT 'E'—TWO-YEAR-OLDS.

| | | |
|---|---|---|
| Number of steers in lot | 9 | |
| First weight gross | 9,775 | lbs. |
| First weight average | 1,079 | “ |
| Finished weight gross | 12,395 | “ |
| Finished weight average | 1,377 | “ |
| Total gain in 180 days | 2,680 | “ |
| Average gain per steer | 298 | “ |
| Daily gain for lot, 9 steers | 14·89 | “ |
| Daily gain per steer | 1·65 | “ |
| Gross cost of feed | $161 62 | |
| Cost of 100 pounds gain | 6 03 | |
| Cost of steers, 9,775 pounds at $4.90 per 100 pounds | 479 97 | |
| Total cost to produce beef, $447.49+$161.59 | 651 59 | |
| Sold, 12,395 pounds at $5.25 per 100 pounds, less 5 per cent | 618 24 | |
| Loss on lot | 33 35 | |
| Net loss per steer | 3 70 | |
| Average buying price per steer | 53 33 | |
| Average selling price per steer | 68 69 | |
| Average increase in value | 15 36 | |
| Average cost of feed per steer | 17 95 | |
| Amount of meal (gluten meal) eaten by lot of 9 steers | 4,086 | lbs. |
| Amount of ensilage and roots | 81,537 | “ |
| Amount of hay | 8,289 | “ |

### LOT 'F'—YEARLINGS.

| | | |
|---|---|---|
| Number of sters in lot | 9 | |
| First weight gross | 8,685 | lbs. |
| First weight average | 965 | “ |
| Finished weight gross | 11,370 | “ |
| Finished weight average | 1,263 | “ |
| Total gain in 180 days | 2,685 | “ |
| Average gain per steer | 298 | “ |
| Daily gain for lot, 9 steers | 14·90 | “ |
| Daily gain per steer | 1·65 | “ |
| Gross cost of feed | $148 97 | |
| Cost of 100 pounds gain | 5 54 | |
| Cost of steers, 9,685 pounds at $4.90 per 100 pounds | 474 56 | |
| Total cost to produce beef, $474.56 + $148.97 | 623 53 | |
| Sold, 11,370 pounds at $5.25 per 100 pounds, less 5 per cent | 596 92 | |
| Loss on lot | 26 61 | |
| Net loss per steer | 2 95 | |
| Average buying price per steer | 52 73 | |
| Average selling price per steer | 66 10 | |
| Average increase in value | 13 37 | |
| Average cost of feed per steer | 16 55 | |
| Amount of meal (gluten meal) eaten by lot of 9 steers | 3,649 | lbs. |
| Amount of ensilage and roots | 74,349 | “ |
| Amount of hay | 8,289 | “ |

### LOT 'G.'—CALVES (6 MONTHS' OLD).

| | | |
|---|---|---|
| Number of steers in lot | 6 | |
| First weight gross | 2,290 | lbs. |
| First weight average | 382 | " |
| Finished weight gross | 3,870 | " |
| Finished weight average | 645 | " |
| Total gain in 186 days | 1,580 | " |
| Average gain per steer | 263 | " |
| Daily gain for lot, 6 steers | 8·77 | " |
| Daily gain per steer | 1·46 | " |
| Gross cost of feed | $ 84 17 | |
| Average cost of feed per steer | 14 03 | |
| Amount of meal (oats, pease, barley and oil meal) eaten by lot of 6 steers | 4,070 | lbs. |
| Amount of ensilage and roots | 32,316 | " |
| Amount of hay | 2,016 | " |

### LOT 'H.'—SKIM MILK CALVES (NEW BORN.).

| | | |
|---|---|---|
| Number of steers in lot | 6 | |
| First weight gross | 791 | lbs. |
| First weight average | 113 | " |
| Last weight gross | 2,702 | " |
| Last weight average | 386 | " |
| Total gain in 184 days | 1,911 | " |
| Average gain per steer | 273 | " |
| Daily gain for lot, 7 steer | 10·36 | " |
| Daily gain per steer | 1·48 | " |
| Gross cost of feed | $ 41 34 | |
| Amount of meal (oats, pease, barley and oil meal) eaten by lot of 7 steers | 2,020 | lbs. |
| Amount of ensilage and roots | 5,558 | " |
| Amount of hay | 420 | " |
| Amount of skim milk | 9,485 | " |

### BABY BEEF *vs.* LONG FEED BEEF

Since May, 1900, an experiment has been carried on having for aim the securing of information as to comparative costs and profits of producing beef, (1) by feeding a heavy ration from birth to block, and (2) by feeding in the usual way, that is, giving only a limited growing ration from birth till five or six months before it is desired to slaughter.

The two lots started in 1901 as well as the two started in 1900 have been sold, and therefore, the whole four lots are reported upon below. The important findings are arranged to facilitate comparison below. Since averages of work with a number of steers is always more interesting and more valuable as a guide than findings from single steers, each column means the average of 5 steers, save in the columns headed 'Average,' one under 'Baby Beef' and one under 'Long Feed Beef,' each of which so named columns is the average of ten steers fed as indicated by the heading 'Baby Beef' or 'Long Feed Beef.'

| Particulars for comparison (1 steer considered always). | Baby Beef. | | | Long Feed Beef. | | |
|---|---|---|---|---|---|---|
| | 1900. Lot of 5 steers. | 1901. Lot of 5 steers. | Average of 10 steers. | Average of 10 steers. | 1901. Lot of 5 steers. | 1900. Lot of 5 steers. |
| | Lbs. | Lbs. | Lbs, | Lbs. | Lbs. | Lbs. |
| Number of days on feed.. ... ........ | 670 | 730 | 700 | 913 | 730 | 1,095 |
| Weight when put on experiment . .... | 150 | 95 | 122½ | 107 | 95 | 119 |
| " " slaughtered............ | 1,300 | 1,295 | 1,297½ | 1,235 | 1,100 | 1,370 |
| Gain during feeding period........... | 1,150 | 1,200 | 1,175 | 1,128 | 1,005 | 1,251 |
| Daily rate of gain . . ...... .. ... | 1·72 | 1·64 | 1·68 | 1·23 | 1·37 | 1·14 |
| Amount meal eaten. .. .. .. ... ....... | 3,018½ | 4,600 | 3,809 | 1,405 | 1,057 | 1,752 |
| " roots and ensilage eaten...... | 15,852 | 15,755 | 15,793 | 19,529 | 14,212 | 24,846 |
| " hay eaten.,............... .. | 1,096 | 1,213½ | 1,150 | 1,315 | 786 | 1,843 |
| " straw. ...... .............. | ......... | ......... | ......... | ......... | ......... | 112 |
| " skim milk.................. | 1,505 | 1,755 | 1,645 | 1,592 | 1,679 | 1,505 |
| " pasture............... ..... | ......... | ......... | ......... | 9 mos. | 6 mos. | 12 mos. |
| " rape......... .. ... ........ | ......... | 740 | 70 | ......... | ......... | ......... |
| Cost of feed from birth to block........ | $54 28 | $71 85 | $63 06 | $59 66 | $43 53 | $75 80 |
| " 100 lbs. increase live weight.... | 4 72 | 5 98 | 5 35 | 5 29 | 4 33 | 6 06½ |
| Sold for per 100 lbs. live weight........ | 5 75 | 5 50 | 5 62½ | 4 78 | 4 50 | 5 25 |

The following table shows the amount of each kind of meal or other food consumed by the average steer in each lot from birth to block and the valuation put upon the different kinds of food in estimating the cost of production.

| Lot. | Skim Milk. | Gluten. | Oil Meal. | Calf Meal | Oats. | Barley. | Pease. | Bran. | Shorts. | Corn. | Roots. | Ensilage. | Hay. | Pasture. | Rape. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1900. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | | Lbs. |
| Fattening .... .... | 1505 | 905 | 392 | .... | 620 | .... | .... | 610 | .... | 491 | 4775 | 11077 | 1096 | | |
| 1901. | | | | | | | | | | | | | | | |
| Fattening...... ... | 1784 | 1102 | 315½ | 18 | 2427½ | .... | 14 | 518 | 10½ | 194 | 4970 | 16785 | 1213½ | .. ..... | 140 |
| 1900. | | | | | | | | | | | | | | | |
| Limited .... . . . | 1505 | 752½ | 171½ | .... | 281½ | 17½ | .... | 299½ | 117½ | ... | 9009 | 15837 | 1843 | 12 mos. | |
| 1901. | | | | | | | | | | | | | | | |
| Limited ........... | 1679 | 405½ | 131½ | .... | 178½ | .... | .... | 252 | 89½ | .... | 4893 | 9319 | 786 | 6 mos. | |
| Price charged per 100 lbs .........$ | 0 15 | 1 25 | 1 33½ | 2 20 | 1 00 | 1 00 | 1 25 | 0 75 | 0 98 | 1 25 | 0 10 | 0 10 | 0 35 | $2 per m. | 0 10 |

This line of work is being continued and below are reports up to date upon the steers now under experiment.

### YEARLINGS.

The lots started out in May, 1902, are as follows:—

### FULL FATTENING RATION.

*Calves Dropped in 1902.*

| | |
|---|---|
| Number of steers in lot | 6 |
| First weight, gross, November 1, 1902 | 2,290 lbs. |
| First weight average, November 1, 1902 | 381 “ |
| Last weight, gross, November 1, 1903 | 4,875 “ |
| Last weight, average, November 1, 1903 | 812½ “ |
| Total gain in 165 days | 2,585 “ |
| Average gain per steer | 431 “ |
| Daily gain per steer | 1·18 “ |
| Gross cost of feed | $ 157 54 |
| Cost of 100 pounds gain | 6 13 |
| Average cost of feed per steer | 26 26 |
| Amount of meal eaten by lot of 6 steers | 5,382 lbs. |
| Amount of ensilage and roots | 33,526 “ |
| Amount of hay | 7,098 “ |
| Each steer was on pasture | 3 mos. |

One steer consumed in 365 days:—

Gluten meal, 274½ lbs; calf meal, 66½ lbs.; oil meal, 62 lbs; oats, 462½ lbs.; bran, 31½ lbs.; roots, 2,659 lbs.; ensilage, 2,929 lbs.; hay, 1,183 lbs.; pasture, 3 months.

### LIMITED GROWING RATION LOT.

*Calves Dropped 1902.*

| | |
|---|---|
| Number of steers in lot | 6 |
| First weight gross, November 1, 1902 | 2,065 lbs. |
| First weight average, November 1, 1902 | 344 “ |
| Last weight gross, November 1, 1903 | 4,165 “ |
| Last weight average | 694 “ |
| Total gain in 365 days | 2,100 “ |
| Average gain per steer | 350 “ |
| Daily gain per steer | 0·96 “ |
| Gross cost of feed | $ 130 67 |
| Cost of 100 pounds gain | 6 22 |
| Average cost of feed per steer | 21 78 |
| Amount of meal eaten by lot of 6 steers | 525 lbs. |
| Amount of ensilage and roots | 43,470 “ |
| Amount of hay | 2,880 “ |
| Each steer was on pasture | 6 mos. |

One steer consumed in 365 days :—

Gluten meal, 24½ lbs.; oats, 63 lbs.; roots, 3,470 lbs.; ensilage, 3,775 lbs.; hay, 480 lbs.; pasture, 6 months.

### CALVES.

The calves from birth till about six months old are fed quite similar rations and make similar gains; therefore only one lot is reported upon

#### FULL FATTENING RATION LOT.

*Calves Dropped April, 1903.*

| | |
|---|---|
| Number of steers in lot | 5 |
| First weight gross | 565 lbs. |
| First weight average | 113 “ |
| Last weight gross | 1,930 “ |
| Last weight average | 386 “ |
| Total gain in 184 days | 1,365 “ |
| Average gain per stweer | 273 “ |
| Daily gain per steer | 1·48 “ |
| Gross cost of feed | $ 29 53 |
| Cost of 100 pounds gain | 2 16 |
| Average cost of feed per steer | 5 90⅗ |
| Average gain per steer | 273 “ |
| Amount of meal eaten by lot of 5 steers | 1,442½ lbs. |
| Amount of ensilage and roots | 3,970 “ |
| Amount of hay | 300 “ |
| Amount of skim milk | 6,775 “ |
| On pasture | 1 mo. |

One calf consumed in 184 days :—

Shorts, 22½ lbs.; oats, 134 lbs.; bran, 74 lbs.; oil meal, 58 lbs.; ensilage or green feed, 794 lbs.; skim milk, 1,355 lbs.; hay, 64 lbs.; pasture, 1 month in day time.

## CROP ON 200-ACRE FARM.

Up to the present no concise summary of the crops upon the 200-acre farm each year has been published. Such a summary of the crop each year for the last five years, 1899 to 1903 inclusive, would no doubt be interesting to many, and is accordingly submitted herewith.

COMPARATIVE Statement of Crops on '200 Acre Farm' from 1899 to 1903, inclusive—(200 Acre Farm includes 7 Acres of Roads).

| Year. | Grain. | | Hay. | | Roots and Corn. | | Pasture. | | Soiling Crop. | | Pig Pasture. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Area in Acres. | Yield in Pounds. | Area in Acres. | Yield in Tons. | Area in Acres. | Yield in Tons. | Area in Acres. | Number of Cattle. | Area in Acres. | Disposition of Crops. | Area in Acres. | Crops Grown for Pasture. | |
| 1899 | 73 | 118,466 | 39 | 93 | 40 | 326½ | 40 | 36 | 1 | Fed to dairy cows | .... | ........ | Generally considered a good year for all crops. |
| 1900 | 80 | 126,621 | 53 | 138 | 40 | 743 | 20 and aftermath | 49 | .... | ........ | .... | ........ | Season very favourable for most crops. |
| 1901 | 79 | 114,472 | 58 | 210 | 40 | 702 | 16 and aftermath | 52 | ... | ........ | .... | ........ | Season very favourable for most crops. |
| 1902 | 74 | 141,914 | 60 | 216 | 39 | 665 | 20 and aftermath | 62 | .... | ........ | 5 | Clover, rape and aftermath. | Season favourable for hay, bad for corn. |
| 1903 | 69 | 126,619 | 62 | 154 | 34 | 473 | 16 and aftermath | 96 | 5 | Dairy cows, bulls and calves. | 6 | Clover and rape. | Season very unfavourable for most crops, particularly adverse to corn and roots. No second crop hay. |

The variety of crops grown and the varying areas under each crop each year make it quite difficult to make a comparison of the returns of the different years, so to simplify matters I would suggest that a fixed valuation be put upon the products and the returns of each year valued accordingly.

Fixing prices as follows: Grain, $1 per 100 lbs.; roots and ensilage, $2 per ton; hay, $7 per ton; pasturing cattle, $8 per season; and area under pigs, $15 per acre; the returns from the '200 Acre Farm' for the years mentioned may be said to have been worth $2,776.66 in 1899; $4,110.21 in 1900; $4,434.72 in 1901; $4,787.14 in 1902; $4,148.19 in 1903.

### UTILIZATION OF FEED.

An examination into the supply of feed produced on the 200-acre farm, the experimental plots of roots and corn, and the meal or grain purchased for use in the barns, together with a detailed statement of the disposal thereof and a statement of the kinds of grain and meal consumed from July 1, 1902, to June 30, 1903, follows:—

SUMMARY of Feed of all kinds used in connection with Stock on 200 Acre Farm from July 1, 1902, to June 30, 1903.

| ——— | Grain or Meal. | Roots and Ensilage. | Hay |
|---|---|---|---|
| | Lbs. | Lbs. | Lbs. |
| Grown on 200 Acre Farm (Crop of 1902) | 144,914 | 1,330,000 | 432,000 |
| Received from Experimental Dep't | ............ | 294,000 | |
| Purchased | 209,730 | ............ | |
| Total | 354,644 | 1,624,000 | 432,000 |
| Value | $3,546.44 | $1,624.00 | $1,512.00 |

DISPOSITION of Feed harvested on, and bought for use of Live Stock on 200 Acre Farm.

| Class Fed. | Hay. | Grain and Meal. | Corn and Roots. | |
|---|---|---|---|---|
| | Lbs. | Lbs. | Lbs. | |
| 19 horses | 145,900 | 105,432 | 5,000 | Hay weighed at intervals and amount calculated. All grain and meal weighed. Roots estimated. |
| 94 steers | 69,429 | 45,909 | 661,085 | All feeds weighed. |
| 37 milch cows, all breeds | 65,585 | 47,837 | 322,696 | All feeds weighed. |
| 47 young stock and bulls, all breeds | 65,999 | 21,646 | 240,252 | Partly weighed and estimated from said weighings. |
| 64 sheep | 19,500 | 3,590 | 4,000 | Meal weighed. Hay and roots estimated. |
| 425 swine | ..... ..... | 97,904 | 46,500 | Meal weighed. Roots partly weighed, balance estimated from weighings. |
| Loss by experimental curing | 10,000 | ........... | | |
| On hand, July 1, 1903 | 20,000 | 9,500 | | |
| Total accounted for | 396,413 | 331,818 | 1,279,533 | |
| Am't harvested and received | 432,000 | 354,644 | 1,624,000 | |
| Shrinkage | 35,587 | 22,826 | 344,467 | |
| Percentage shrinkage | 8·24% | 6·43% | 21·21% | |

The meal consumed consisted of oats, 148,782 lbs.; barley, 10,919 lbs.; bran, 45,281 lbs.; oil meal 13,879 lbs.; glutten meal, 43,755 lbs.; pease, 3,110 lbs.; shorts, 50,779 lbs.; mixed crop (oats, pease, barley), 14,073 lbs.; feed flour, 700 lbs. Total. 331,818 lbs.

## BALANCE SHEET OR FINANCIAL STATEMENT OF LIVE STOCK FEEDING OPERATIONS ON 200 ACRE FARM, JULY 1, 1902, TO JUNE 30, 1903.

In compiling the following table, the figures in the columns headed 'Value' in both 1902 and 1903 represent either the cost price of the animals included, where recently bought or the fair merchantable price of the same at the date of valuation.

Under the heading 'Returns' are included values of products and services during the year.

In the case of horses the services of the 19 head are valued at $3,061.80, but since the labour of six horses is required to do the work on the 200 acre farm; only $2,041.20 or two-thirds of the value of their labour is credited to them.

### COMPARATIVE STATEMENTS.

| — | July 1, 1902. | | July 30, 1903. | | | Gross returns made up of increase in value, value of products and animals sold. |
|---|---|---|---|---|---|---|
| | Number on hand. | Value. | Number on hand. | Value. | Returns. | |
| | | $ cts. | | $ cts. | $ cts. | $ cts. |
| Horses | 19 | ........ | 19 | ........ | 2,041 20 | 2,041 20 |
| Shorthorns—<br>Pure bred and grade | 16 | 2,155 00 | 26 | 3,410 00 | 627 77 | 1,882 77 |
| Ayrshires—<br>Pure bred and grade | 21 | 1,650 00 | 30 | 2.410 00 | 911 80 | 1,671 80 |
| Guernseys—<br>Pure bred and grade | 17 | 1,516 00 | 23 | 1,956 00 | 804 40 | 1,244 40 |
| Canadians—<br>Pure bred and grade | 6 | 725 00 | 9 | 895 00 | 394 62 | 564 62 |
| Steers | 94 | 3,351 65 | 94 | 4,951 06 | ........ | 1,599 41 |
| Sheep | 33 | 790 00 | 64 | 935 00 | 38 00 | 183 00 |
| Swine | 185 | 1,480 00 | 255 | 2,040 00 | 1,987 00 | 2,547 00 |
| Total | 391 | 11,667 65 | 514 | 16,597 06 | 6,804 79 | 11,734 20 |

### SUMMARY.

#### RETURNS.

| | |
|---|---|
| Gross returns from animals of all classes, including value of products, value of services and increase in value of young stock | $11,734 20 |
| Manure, 950 tons at $1.00 per ton | 950 00 |
| | $12,684 20 |

EXPENDITURE.

*Value of Food Consumed.*

| | | |
|---|---|---|
| Meal, 354,644 lbs. | $3,546 44 | |
| Hay, 432,000 lbs. | 1,512 00 | |
| Roots and ensilage, 1,624,000 lbs. | 1,624 00 | |
| Whole milk, 26,550 lbs. | 265 50 | |
| Skim milk, 170,000 lbs. | 255 00 | |
| Total | $7,202 94 | |
| Value of straw for litter—95 tons at $4.00 | 380 00 | |
| Cost of labour in connection with care of horses, cattle, sheep and swine:— | | |
| Herdsman | 600 00 | |
| Two men at $480 each | 960 00 | |
| Three men at $432 each | 1,296 00 | |
| Total expenditure | $10,438 94 | |
| | | $10,438 94 |
| Balance of returns over expenditure | | $2,245 26 |

## STAVE SILO.

In August, 1903, a round silo was erected 20 feet in diameter and 35⅔ feet high, capacity about 250 tons.

The soil was excavated to a depth of 3 feet 8 inches, and the silo was built of cement to a height even with the surface of the surrounding earth. On top of this a stave silo 32 feet high was erected. The cost was as follows :—

COST OF SILO.

| | |
|---|---|
| Labour—Woodwork | $ 55 70 |
| " Foundation | 47 31 |
| Lumber | 126 00 |
| Hardware | 6 87 |
| Tarring | 14 65 |
| Painting | 20 00 |
| Iron bands | 86 00 |
| Cement | 11 72 |
| Total cost | $368 25 |

No roof was built in order to gain some information as the inconvenience or loss that would arise from snow and rain falling at will upon the surface during the winter.

The cement section was, of course, a matter of local convenience, and the cost of that part may be estimated as raising the cost of the silo about $75 above the cost of a stave silo of similar capacity with a common ring foundation.

## ESTIMATING COST OF PRODUCTION.

The importance of determining cost of production of our grain and forage crops is scarcely questionable. The climatic and soil factors must, however, always be of primary importance, and on that account all estimates must be more or less particular in their bearing rather than general.

In the estimates which are included in the following reports on the different crops, rent, manure, labour, material (seed, twine, &c.) and wear and tear are considered. The item of supervision, of considerable moment on such farms as this, has been omitted, since most farmers in Canada do much of their own work, as well as direct the labour of such men as they employ.

The digestibility of a feed is another factor which must enter materially into any consideration of its economy of production, since, as is well known, the digestibility of our feeding stuffs ranges from about 25 per cent of the dry matter to practically 100 per cent. of the whole thing.

In dividing the cost of production of a grain crop between the straw and grain, however, where the digestible dry matter of the one part is so different in composition and value from that of the other, some additional standard is necessary. Since protein is that part of any ration the most expensive to supply, it was decided to make the digestible protein the basis of value. It is, of course, well understood that protein is not the only important constituent of straw, frequently it is of very minor consideration, indeed, as when used for litter.

## CROP ON 200 ACRE FARM, 1903.

### OATS

Five varieties of oats were grown. They were Banner, Improved Ligowo, Tartar King, Waverley and Goldfinder. They were sown on land that had been in roots or corn or meadow the preceding year. As the land was not of uniform character, the results will not indicate the comparative productivity of the different varieties.

The particulars of the plots sown are as follows:—

1. *Banner.*—39 acres, sown April 15, 2 bushels per acre; matured in 124 days, August 17. Yielded 2,233 bushels, or 57 bushels 9 lbs. per acre. Measured bushel weighed 41¼ pounds.

| | Lbs. |
|---|---|
| Total weight of straw and grain.... .... .... .......... | 168,205 |
| Weight of grain.... .... ......... ...... ............ | 75,922 |

Grain constituted 45·1 per cent of the whole crop.

2. *Improved Ligowo.*—3 acres, sown April 21, 1¾ bushels per acre; matured in 116 days, August 15. Yielded 126 bushels 13 pounds or 42 bushels 4 pounds per acre. Measured bushel weighed 38 pounds.

| | Lbs. |
|---|---|
| Total weight, straw and grain.... .... .... .... .... .... | 11,860 |
| Weight of grain.... .... .... .... .... .... .... ...... | 4,297 |

Grain constituted 36·2 per cent of the whole crop.

3. *Tartar King.*—3 acres, sown April 21, 2 bushels per acre; matured in 118 days, August 17. Yielded 104 bushels, or 33 bushels 23 lbs. per acre. Measured bushel weighed 37½ pounds.

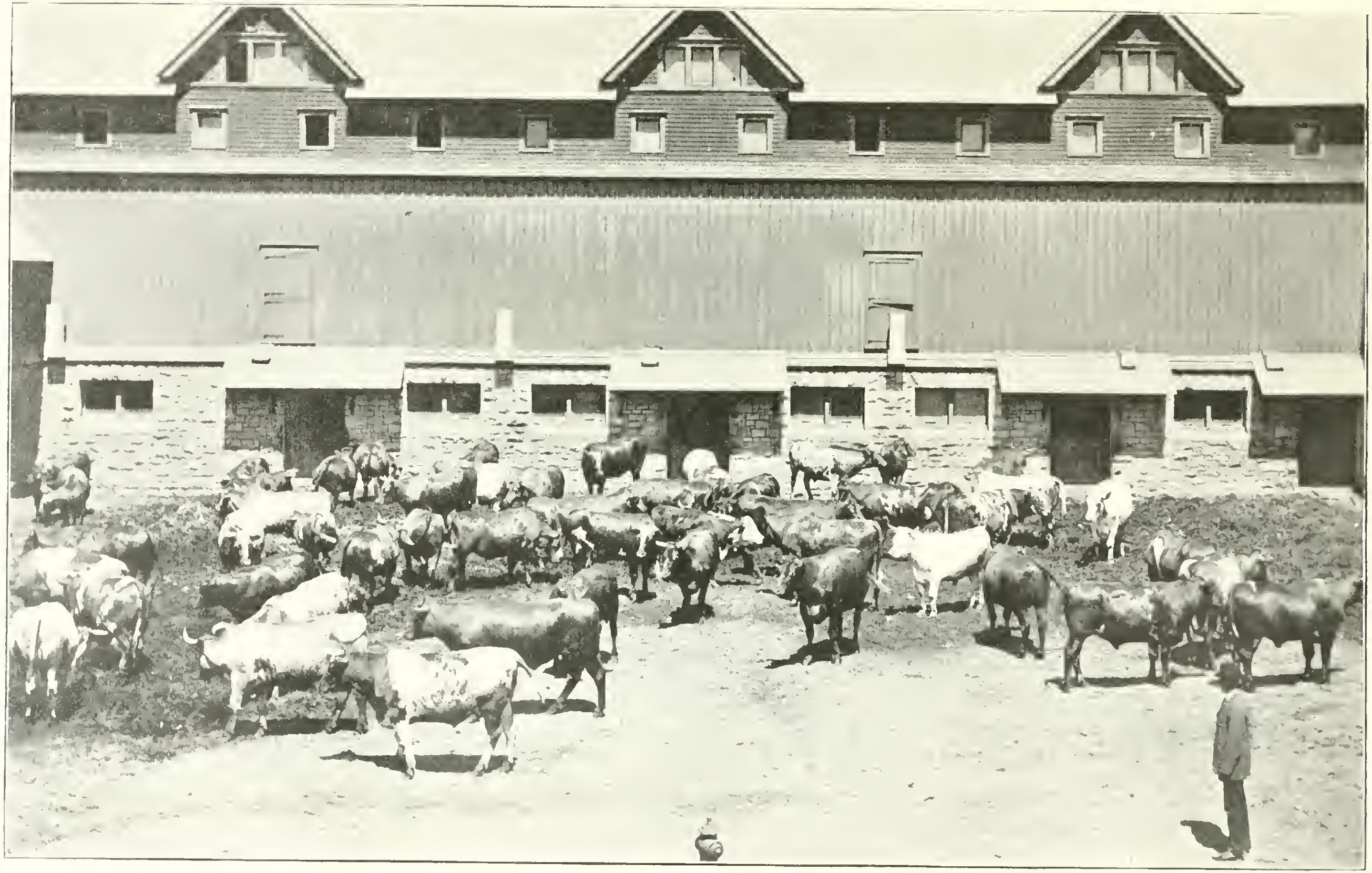
| | Lbs. |
|---|---|
| Total weight, straw and grain.... .... .. .... .......... | 14,935 |
| Weight of grain.... .... .... ........ .... ..... ......... | 3,570 |

Grain constituted 24 per cent of the whole crop.

4. *Waverley.*—2 acres, sown April 23, 1¾ bushels per acre; matured in 122 days, August 23. Yielded 84 bushels 12 lbs., or 42 bushels 6 lbs. per acre. Measured bushel weighed 38½ pounds.

| | Lbs. |
|---|---|
| Total weight, straw and grain.... .... .... .... .......... | 10,095 |
| Grain weighed...... .... .... ......... .... ............ | 2,868 |

Grain constituted 28·4 per cent of the whole crop.



(Photo. by C. E. Saunders.)

STEERS FATTENED AT CENTRAL EXPERIMENTAL FARM AND READY FOR BRITISH MARKET.

5. *Goldfinder.*—3 acres, sown April 23, 2 bushels per acre; matured in 125 days, August 25. Yielded 126 bushels 11 pounds, or 42 bushels 4 pounds per acre. Measured bushel weighed 36 pounds.

| | Lbs. |
|---|---|
| Total weight straw and grain | 13,980 |
| Weight of grain | 4,295 |

Grain constituted 30·8 per cent of the whole crop.

6. *Banner.*—2 acres. See mixed crop experiment.

### COST OF GROWING 52 ACRES OF OATS.

| | |
|---|---|
| Rent of land, 52 acres at $3 per acre | $156 00 |
| Gang ploughing in autumn, 29 acres at $1 per acre | 29 00 |
| Cultivating and ribbing in autumn, 11 days at $2.50 per day | 27 50 |
| Cultivating and harrowing in spring, 9½ days at $2.50 | 23 75 |
| One-fifth manure at the rate of 15 tons per acre, applied in root and corn year at $1 per ton | 156 00 |
| Seed, 104 bushels at 50 cents per bushel | 52 00 |
| Sowing five days at $2.50 per day | 12 50 |
| Use of machinery, 20 cents per acre | 10 40 |
| Shocking, 11 days at $1.33⅓ | 14 67 |
| Loading and unloading, 24 days, $1.33⅓ | 32 00 |
| Teams drawing, 8½ days at $2.50 | 21 25 |
| Threshing, 2,782 bushels at 2½ cents per bushel | 69 55 |
| Total cost | $604 62 |
| Cost to produce one bushel oats, value of straw neglected | 21·7 cts. |
| Cost to produce one bushel oats, value of straw neglected and no allowance made for rent or manure | 10·6 " |

### ANALYSIS OF COST.

Fifty-two acres produced 228,765 lbs. crop. The grain was weighed as it was threshed, but not so the straw. There was threshed 94,928 lbs. of grain, leaving 133,837 lbs. to be made up in chaff or straw. If 10 per cent be allowed for loss by drying out, etc., there would still remain about 120,000 lbs., or 60 tons of straw.

One ton oats contains about 184 lbs. digestible protein.

One ton oat straw contains about 24 lbs. digestible protein.

Hence we may arrive at the relative values of the two parts of the crop as follows:

94,828 lbs. oats contains 8,724 lbs. digestible protein.
60 tons straw contains 1,440 lbs. digestible protein.

The cost of production, $604.62, divided in this proportion, allows $518.96 for the grain and $85.66 for the straw. We might say, therefore, that the cost of production was 18·7 cents per bushel for the oats, and $1.43 per ton for the straw.

### MIXED CROP EXPERIMENT.

Side by side on the second year of the rotation field, that is, on what had been pastured the preceding year, were sown seven plots of two acres each, the aim being to get some data as to the comparative yields of crops grown as mixtures and as pure grain. The mixtures and pure grains are as follows, with the yield of the respective crops of both grain and straw in column 1 and the yield of grain in column 2 :—

| | 1. Grain and Straw. Lbs. | 2. Grain. Lbs. |
|---|---|---|
| Plot 1.—Pure barley, Mensury, yielded. . . . . . . . | 9,230 | 3,686 |
| Plot 3.—Pure oats, Banner, yielded. . . . . . . . . . | 9,690 | 4,320 |
| Plot 3.—Pure pease, Prussian blue, yielded. . . . . . | * | 3,010 |
| Plot 4.—Pease, 1 bushel; oats, 2 bushels. . . . . . . . | 7,930 | 2,867 |
| Plot 5.—Oats, 1½ bushels; barley, 1 bushel. . . . . . . . | 8,670 | 3,578 |
| Plot 6.—Wheat, ¾ bushel; oats, 1 bushel; pease, ¾ bushel; barley, ¾ bushel. . . . . . . . . . . . . . . . . . | 9,800 | 3,140 |
| Plot 7.—Oats, 1 bushel; pease, 1 bushel; barley, 1 bushel. . . . . . . . . . . . . . . . . . . . . . . . . . . . | 8,380 | 2,090 |

*Not weighed.

## INFLUENCE OF AMOUNT OF SEED AND SPACES BETWEEN ROWS OF GRAIN UPON QUALITY AND QUANTITY OF GRAIN HARVESTED.

A four acre field of land of as nearly uniform soil character as possible was divided into four 1 acre plots and sown as follows:—

Plot 1.—Waverley oats, in drills 7 inches apart.

Plot 2.—Waverley oats, in drills 14 inches apart.

Plot 3. Canadian Thorpe barley, in drills 14 inches apart.

Plot 4.—Canadian Thorpe barley, in drills 7 inches apart.

In quality no differenec was perceptible in the case of the Waverley oats, and the measured bushel for each plot weighed 38½ lbs.

In the case of the Canadian Thorpe barley, however, the grain from the 7-inch apart drill plots was noticeably superior to that from the 14-inch drills plot.

Plot 1.—Waverley oats, sown April 23, drill set at 1¾ bushels per acre; matured in 122 days. Yielded 45 bushels 15 lbs. per acre. Measured bushel, 38½ lbs.

This plot was sown the ordinary way with seed drill, drills 7 inches apart and sowing 14 gallons seed per acre.

| | Lbs. |
|---|---|
| Total weight straw and grain. . . . . . . . . . . . . . . . . . . . | 5,073 |
| Weight of grain. . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 1,545 |

Grain constituted 30·4 per eent of the whole crop.

Plot 2.—Waverley oats, sown April 23, drill set at 1¾ bushels per acre; matured in 122 days, August 23. Yielded 45 bushels 5 pounds per acre. Measured bushel weighed 38½ lbs.

This plot was sown with the same drill as Plot 1, but had every alternate spout blocked, making the drills 14 inches apart and sowing 7 gallons per acre.

| | Lbs. |
|---|---|
| Total weight straw and grain. . . . . . . . . . . . . . . . . . . . | 5,300 |
| Weight of grain. . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 1,535 |

Grain eonstituted 28·9 per eent of the whole crop.

Plot 4.—Canadian Thorpe Barley (two-rowed), 1 acre sown April 22, 2 bushels per acre; matured in 110 days. yielded 32 bushels 9 lbs. per acre. Measured bushel weighed 52½ lbs.

This plot was sown in the usual way with a force feed seed drill, rows 7 inches apart, sowing 2 bushels per acre.

| | Lbs. |
|---|---|
| Total weight of grain and straw. . . . . . . . . . . . . . . . . . . . | 4,190 |
| Weight of grain. . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 1,545 |

Grain constitued 36·8 per cent of the whole crop.

Plot 3.—Canadian Thorpe Barley, sown April 22, seeder set to sow 2 bushels per acre; matured in 110 days. Yielded 28 bushels 31 lbs. per acre. Measured bushel weighed 51¾ lbs.

This plot was sown with same drill as above, but every alternate spout blocked, making drills 14 inches apart, sowing 1 bushel per acre.

| | Lbs. |
|---|---|
| Total weight of grain and straw | 4,530 |
| Weight of grain | 1,375 |

Grain constituted 30·5 per cent of the whole crop.

### SOILING CROPS.

Mixed crop, 11 acres oats, pease, barley, equal parts by weight, 2½ bushels per acre, and clover 10 lbs. per acre.

This mixture was sown at intervals from April 14 to June 7, cut for green feed for cattle and hogs, in some parts two crops were cut and an excellent growth of clover was afterwards pastured.

## HAY.

Hay was harvested off 66 acres. Owing to the long spring drought the yield was only small. There was no second crop off the first year meadows for the same reason.

The total crop off 66 acres was 154 tons 1,480 lbs., making an average yield of 2 tons 689 lbs. per acre.

### COST OF GROWING 66 ACRES OF HAY.

| | |
|---|---|
| Rent of land at $3 per acre | $198 00 |
| One-fifth manure at the rate of 15 tons per acre, $1 per ton | 198 00 |
| Half cost of seed | 50 16 |
| Seven days' cutting with mower at $2.50 per day | 17 50 |
| Seven and one-half days' raking at $1.75 per day | 13 12½ |
| Six days' teddering at $1.75 per day | 10 50 |
| Rent of farm machinery, oil, &c., at 20 cents per acre | 13 20 |
| Cocking, loading and unloading, 48½ days at $1.33⅓ per day | 64 75 |
| Thirteen days' drawing to barn at $2.50 per day | 32 50 |
| Four days' team on horse fork at $2.50 per day | 10 00 |
| | $607 93½ |

Total hay, 154 tons 1,480 lbs.

Cost to produce 1 ton in barn, $3.93.

## EXPERIMENTS WITH GRASSES AND CLOVERS.

To gain some information as to the value of the more common grasses and clovers, as hay and pasture crops when sown together in different proportions, the following experiment was conducted:—

In 1902 that 40 acre field of the 200 acre farm which had been under corn in 1901, was sown to Banner oats. Beginning at one side of the field, it was laid off in 5 acre plots, each plot extending clear across the field, and including in its area sandy, loamy and peaty soils. The plots were similar in the variety of the soils they included, and under the usual hay and pasture mixture of 10 lbs. timothy and 8 lbs. clover would have been expected to give similar returns, with possibly a slight advantage in favour of plots 1 and 2.

Particulars of seeding and returns in hay are as follows:—

| — | Grasses. | Lbs. | Clovers. | Lbs. | Yield per acre. | | Total Yield. | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Tons. | Lbs. | Tons. | Lbs. |
| Plot 1, 5 acres | Timothy | 10 | Common Red | 8 | 1 | 1,502 | 8 | 1,510 |
| Plot 2, 5 acres | Timothy | 4 | Alfalfa | 8 | 1 | 1,184 | 7 | 1,920 |
| | Bromus Inermis | 8 | Common Red | 6 | | | | |
| | Orchard Grass | 8 | | | | | | |
| Plot 3, 5 acres | Timothy | 4 | Alsike | 2 | 1 | 836 | 7 | 180 |
| | Bromus Inermis | 8 | Common Red | 6 | | | | |
| | Orchard | 8 | | | | | | |
| Plot 4, 5 acres | Timothy | 5 | Alsike | 2 | 0 | 1,504 | 3 | 1,520 |
| | Orchard | 16 | Common Red | 6 | | | | |
| Plot 5, 5 acres | Timothy | 5 | Alsike | 2 | 1 | 934 | 7 | 670 |
| | Bromus Inermis | 15 | Common Red | 6 | | | | |

The early part of the growing season was particularly unsuitable for grasses and clovers on account of the dry weather. The following notes are submitted, however, and may serve to modify to some extent the teachings of the above report.

*Plot 1.*—Both Clover and Timothy made a strong rapid growth on each of the various kinds of soil.

*Plot 2.*—Timothy and Brome grass made good growth on all soils. Alfalfa did exceedingly well on sand and loam, but was utterly lacking on the peat. Red clover grew all over. Orchard grass very weak growth.

*Plot 3.*—Timothy, Brome and Orchard, as in plot 2. Alsike lacking and Red clover a fair growth all over.

*Plot 4.*—Timothy good growth for seed sown. Orchard a poor tufty growth due no doubt in large measure to adverse weather conditions. Alsike clover lacking. Red clover fair growth all over.

*Plot 5.*—Timothy and Brome good crop all over. Alsike lacking. Red clover fair growth all over.

### VALUE AS PASTURE MIXTURES.

It was of course quite impossible to estimate the exact amount of pasturage available from the aftermath of each plot, but the following notes may be of some value.

*Plot 1.*—Fairly thick growth, apparently palatable to cattle.

*Plot 2.*—Excellent growth, not favoured by cattle at first, but when taste for alfalfa was once acquired, this plot became the favourite grazing plot, and appeared to furnish much more food than any one other of the plots.

*Plot 3.*—Poor aftermath. Cattle not very fond of same, and grazed thereon only after plots 2, 1 and 5 were eaten close.

*Plot 4.*—Poor aftermath. Not liked by cattle.

*Plot 5.*—Fair aftermath. Cattle seemed to like it best next after plots 2 and 1.

## LOSS OF WEIGHT.

### IN HAY.

To gain some information as to the amount of loss of weight in hay in mows, the following experiment has been conducted :—

On August 15, 1903, two small mows were filled with well cured hay from the same field from 1 till 5 o'clock in the afternoon.

Mow No. 1—Held 4 tons 800 lbs. new hay. This hay when weighed December 7, 1903, was found to contain 4 tons 800 lbs., a loss of 375 lbs. or 4·3 per cent in 113 days.

Mow No. 2—Held 4 tons 80 lbs. new hay. This hay when weighed January 7, 1904, was found to contain 3 tons 1,665 lbs., a loss of 415 lbs., or 5·1 per cent in 144 days.

## CORN.

Five varieties of corn were sown:—

*Early Mastodon.*—Planted in hills, 5 acres, sown May 16, cut for ensilage September 23. Yielded 13 tons 265 lbs. per acre. Growth strong; rather uneven, on account of the very weather just after sowing. Very well cobbed, cut in dough stage. Promising sort.

*Selected Leaming.*—Planted in hills, 35 inches apart, 7 acres. Sown May 23, cut ensilage September 26 to 28; yielded 15 tons 1,735 lbs. per acre. Growth strong and even, well cobbed, but very late owing to bad season. Cobs mostly in early milk. Part of this plot suffered from drought in spring, lessening weight per acre.

*Longfellow.*—Sown in drills, 35 inches apart, 4½ acres. Sown May 23, cut for ensilage September 26; yielded 13 tons 52 pounds per acre. Growth strong and even, well cobbed, mostly in milk, some in dough stage.

*Selected Leaming.*—Sown in drills, 35 inches apart, 7 acres. Sown May 23, cut for ensilage September 30; yielded 13 tons 1,947 lbs, per acre. This plot also suffered from drought. lessening weight per acre.

*Selected Leaming.*—Planted in hills, 35 inches apart, 7 acres. Sown May 23, cut for ensilage September 25; yielded 8 tons 879 lbs. per acre. This plot suffered very heavily from drought, so the yield per acre was lessened.

*Thoroughbred White Flint.*—3 acres. Sown June 3, cut for ensilage September 28; yielded 16 tons 156 lbs. per acre. Growth very strong and even; good showing for cobs mostly in early stage sown too late for making best ensilage. This variety and the next 3 acre plot of Mammoth Cuban were sown to replace root crop ruined by drought.

*Mammoth Cuban.*—3 acres sown June 3, cut for ensilage September 29; yielded 16 tons 1,830 lbs. per acre. Growth very strong, even, good showing for cobs, mostly in very early stage.

*Cost of Growing 34 Acres of Corn*—

| | |
|---|---|
| Rent of land at $3 per acre.... .... .... ..... ....... .. | $102 00 |
| Cultivating, ribbing and shallow ploughing, 6 days at $2.50 per day.... .... ....... ..... ........ ...... | 15 00 |
| One-fifth manure, at 15 tons per acre, $1 per ton.... ...... | 102 00 |
| Ploughing in autumn, 8 acres at $2 per acre.... ........ | 16 00 |
| Cultivating in spring, 3 days at $2.50.... .... ....... .... | 7 50 |
| Ploughing 14 acres at $2. gang ploughing 8 acres at $1 in spring.... .... ....... ... ....... ..... ......... | 36 00 |
| Harrowing in spring, 2 days, $2.50.... .... .. ....... ..... | 5 00 |
| Seed, 25 lbs. per acre, 850 pounds at $1 per bushel.... .... | 15 19 |
| Sowing, team, 3 days at $2.50 per day.... .... ....... .. | 7 50 |
| Marking, 2 days, 1 horse at $1.75 per day.... .... ....... | 3 50 |
| Planting 7 acres, 2 days at $1.33⅓ per day.... .... ..... .. | 2 67 |
| Harrowing after sowing, 4 days at $2.50.... .... ...... .... | 10 00 |
| Hoeing, 55 days, $133⅓.... .... .... .... .... .......... | 73 33 |
| Cultivating team, 33 days at $2.50........... .... ...... | 82 50 |
| Cultivating single horse, 14 days, $1.75..... .... ...... | 24 50 |

| | |
|---|---|
| Cutting with corn harvester, 7 days at $2.50 | $17 50 |
| Loading, unloading, tramping and putting into silo, 69 days, $1.33⅓ per day | 92 00 |
| Drawing with team, 24 days at $2.50 | 60 00 |
| Use of machinery, 20 cents per acre | 7 05 |
| Twine 5 lbs. per acre, 170 lbs. at 12 cents | 20 40 |
| Use of engine, fuel, ensilage cutter, and engineering, 6 days at $6.50 per day | 39 00 |
| Total cost | $738 64 |

Average yield per acre, 13¼ tons.
Thirty-four acres yielded 450 tons 1,107 lbs.
To produce 1 ton ensilage in silo cost $1.64.
Cost to produce 1 acre corn in silo, $21.73.

## ROOTS.

Owing to adverse weather conditions in May and June, it was found necessary to break up on June 2 all the land that had been sown to roots about the middle of May.

It was decided to reseed one acre to sugar beets, mangels and turnips. Below are reports upon the different small plots. All were sown on June 15 and harvested October 30.

### SUGAR BEETS.

*Wanzleben*—⅛ acre. Yielded 2,870 ibs. or 47 bushels 50 lbs.; yield at the rate of 11 tons 960 lbs. per acre.

*Giant Sugar Feeding Mangel*—⅛ acre. Yielded 2,910 lbs. or 48 bushels 30 lbs.; yield at the rate of 11 tons 1,280 lbs. per acre.

### MANGELS.

*Gate Post Red*—¼ acre. Yielded 8,220 ibs. or 133 bushels 40 lbs.; yield at the rate of 16 tons 80 lbs. per acre.

### TURNIPS.

*Prize Purple Top*—½ acre. Yielded 10,280 lbs. or 171 bushels 20 lbs.; yield at the rate of 10 tons 560 lbs. per acre.

## EXPERIMENTAL SILO.

Three years ago a silo was constructed to be used for experimental purposes.

Different green crops have been tested as to their fitness for ensilage production, and reported upon in former reports.

This silo was again filled during September, 1903, but as the contents have not been fed out yet, it is impossible for me to report upon the same.

The contents at present are as follows, beginning at the bottom:—

| | | Lbs. |
|---|---|---|
| 1. | Pure corn late milk stage | 9,370 |
| 2. | Corn late milk stage | 5,280 |
| | Rape cut when about 15 inches high, mixed while going through blower or cut box | 5,280 |
| 3. | Pure corn, late milk stage | 960 |
| 4. | Pure rape, cut when about 15 inches high | 5,620 |
| 5. | Corn, late milk stage | 12,370 |
| | Sunflower heads mixed going through machine | 2,120 |
| 6. | Horse beans | 1,002 |

## LITTER OR BEDDING FOR CATTLE.

An experiment to gain some information as to the influences affecting the consumption of straw for litter was conducted during the month of March.

Experiment lasted 23 days.

Lot 1.—9 three year old steers in box stall required during 23 days 2,375 lbs. long wheat straw.

Lot 2.—9 three year old steers tied required during 23 days 1,150 lbs, long wheat straw.

Lot 3.—9 three year old steers tied required during 23 days 2,300 lbs. cut wheat straw.

## EFFECTS OF ROTTING OR HEATING OF MANURE UPON VITALITY OF WEED SEEDS.

In March some straw containing a considerable amount of scutch, twitch or quack grass (Agropyrum repens) was used for bedding the steers in the box stalls, and it was decided to heat or rot half the manure to note the effect upon the vitality of the objectionable seeds likely to be found among the straw.

The manure produced weighed 42,876 lbs. Half of this was hauled out upon the field and put in small piles and the other half was piled in a low flat topped pile to induce rotting or heating.

The manure weighed when piled 21,438 lbs., and when drawn to the field weighed 18,650 lbs.

The rotted manure was put on a plot of land adjoining the plot upon which the green manure had been placed.

A careful watch was kept to note the comparative weediness of the two plots.

Both plots showed a considerable growth of scutch grass, but the rotted manure plot seemed quite as badly infested as the green manure plot.

# REPORT OF THE HORTICULTURIST

(W. T. Macoun.)

December 1, 1903.

Dr. Wm. Saunders,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit herewith the seventeenth annual report of this division. In the following pages will be found the results of some of the most important experiments conducted during the past year.

*Character of season.*—Winter set in at Ottawa on November 25, 1902, with the ground frozen, and on the 26th and 27th, five inches of snow fell, which gradually increased during the month of December, the result being that practically all the frost came out of the ground and, as in the winter of 1901-02, the soil remained unfrozen all winter. December was an unusually cold month, the temperature falling to 25° F. below zero on the 9th. January was also cold, the temperature going down to 29·8° F. below zero on the 19th, this being the coldest day of the winter and the lowest temperature since 1896, when the lowest was 30·7° F. below zero. There were a few very cold days in February, the coldest being 22° F. below zero on the 18th, but the month on the whole, was only moderately cold. There was an abundant snowfall in January and February, with few days above freezing, so that although the weather was cold there was good protection for the roots of trees and for herbaceous plants. The weather became mild during the first week of March and continued so all month with very little snow or rain. Sleighing was gone before the middle of the month. The first ploughing was done in the plum orchard on March 23, the earliest date in the history of the farm. The ground was in excellent condition with no frost in it. April was mild to cool, except during the last three days, when it was warmer, the temperature rising on the 30th to 82° F. On May 1 and 2, 1903, there were seven and nine degrees of frost respectively, which did much damage. Market gardeners who had set out early vegetables, lost heavily. Asparagus, wherever it showed, was frozen back to the ground, and rhubarb was considerably injured also. Apples were unaffected. The flowers of the native plums were injured by this frost, and the crop much lessened. Nearly all the flowers of the cherries were destroyed, although a large part had probably been already killed by winter. Strawberries were badly affected by frosts on May 24 and 29, and also by the drought, as a result of which the crop of many varieties was practically a failure. Grapes, raspberries, currants and gooseberries were little affected.

The severest drought since the Central Experimental Farm was established, seventeen years ago, and one of the severest in the history of this country, was experienced this year. There was little precipitation of any kind during the months of March, April and May, and it was not until June 11, that the drought was broken. Notwithstanding the moisture from the snow which fell in the winter, the ground appeared drier during the month of May than it had ever been in midsummer before. Vegetable seeds, which had been sown on May 8, did not germinate until June 29. Potato sets, where they were near the surface, in some cases dried up in the ground. Apple trees did not suffer, as the soil was kept cultivated. Trees in the plum orchard, however, were affected, as the soil is naturally drier there, and it was necessary to water and mulch the young trees to keep them from dying. The dry weather was very hard on herbaceous plants and trees, which had been set out in the spring, and although the perennials in the botanic garden were watered three times, a considerable number died from the drought. By June the grass was dried up as in the driest time in midsummer. There was abundant rain after June 11, and it was not long before there was little indication left of the drought.

June, July and August were cool for summer months. The warmest day was on July 8, when the temperature rose to 90° F. In August the highest temperature was only 80° F., which occurred on the 6th. There were a great many rainy days in these months. September and October were fine and warm, and fruits and vegetables matured well. Although there was a little white frost locally during the last week of September, there was no frost recorded by the thermometer until October 19, when it was 30° F., and until that date even tomatoes and melon vines were uninjured. On October 26, the temperature dropped to 27° F., when most foliage was destroyed.

November was mild until the 5th, when it became cooler. Winter set in on November 16, and there was sufficient snow for sleighing by November 24. The last week of November was cold, the temperature falling to zero on the 26th.

*Fruit and vegetable crops.*—The apple crop in the provinces of Ontario and Quebec was good this year, and the fruit was of much better quality than last year, the dry weather in the early part of the season being unfavourable to the development of the apple spot fungus, as a result of which the fruit was much freer from spot than usual, this being especially true of the fruit in eastern Ontario and Quebec. There was a heavy crop of peaches, which made the fruit very cheap this year. There was also a good crop of pears. The plum crop was unusually heavy, and on the whole did not prove profitable. Thousands of baskets were left to rot in the orchards, as the markets were glutted with this fruit. There was an average crop of grapes in the Niagara district, but in the Lake Erie district the crop was nearly ruined by black rot. The crop of small fruits was an average one, except in northern and eastern Ontario and in some parts of the province of Quebec, where spring frosts and drought reduced the crop. Strawberries suffered most.

At the Central Experimental Farm the apple crop, though considerably less than last year, was fine in quality. There were few worms of the codling moth and no spot, and the fruit matured well. The plum crop, though better than last year, was not an average one. Cherries were a failure again this year, owing to winter killing of the flower buds. The fine weather of September and October was very favourable to grapes, and 101 varieties ripened. The crop of raspberries and currants was about an average one, but the dry weather reduced the gooseberry crop somewhat. The blackberry crop was better than usual this year. The yield of strawberries was light, as frosts when the plants were in bloom and the drought were very hard on this fruit. Owing to the dry weather in spring which delayed the germination of the seeds, to the spring frosts, and to the cool summer, it was a poor year for vegetables in eastern Ontario and part of the province of Quebec. The potato crop was much reduced by the dry weather, and by blight and rot in the autumn where the vines were unsprayed. Tomatoes did not ripen well and the crop was not nearly as large as usual. The melon crop was a failure. Celery was good, owing to the cool moist weather of late summer.

## MEETINGS ATTENDED, ADDRESSES GIVEN AND PLACES VISITED.

A part of the work of the Horticulturist is to attend meetings of farmers, fruit growers and horticultural societies throughout the country, and to give addresses on horticultural topics. During the past year quite a number of such meetings were attended.

Following were the meetings attended with subjects of addresses:—

Annual meeting, Ontario Fruit Growers' Association, Walkerton, Ont., December 1, 2 and 3.—'Special Methods of Fruit Culture for Special Conditions.'

Annual meeting, Quebec Pomological Society, Waterloo, Que., December.—‘Strawberries.’

Annual meeting, New Brunswick Farmers’ Association, Sussex, N.B., January 26-28.—‘Preparation of Soil, Cultivation and Fertilizing of Orchards and Potato Culture.’

Woodstock, N.B., January 29-30.—‘Strawberries.’

Annual meeting, Nova Scotia Farmers’ Association, Windsor, N.S., February 4.—‘Potato Culture.’

Annual meeting, Prince-Edward Island Fruit Growers’ Association, Charlotte- ‘The Individuality of Fruits.’

Annual meeting, Prince Edward Island Fruit Growers’ Association, Charlottetown, P.E.I., February 10.—‘Site and Protection of an Orchard.’

Meeting at Miscouche, P.E.I., February 12.—‘Fruit Growing.’

Meeting at Hazelbrook, February 11.—‘Fruit Growing.’

Meeting at Smith’s Falls, Horticultural Society, Smith’s Falls, Ont., March 31.—‘The Improvement of the Home Grounds.’

Meeting, Belleville, Fruit Growers’ Association, Belleville, Ont., April 8.—‘Recent Changes in Orchard Methods.’

Orchard meeting, at Vernon, Fallowfield and Metcalfe, Ont., July 7, 8 and 9.—‘Demonstrations in Orchard Work.’

Summer meeting, Quebec Pomological Society, Abbotsford, Que., August 26, 27.—‘Individuality of Fruits,’ ‘Hardy Climbers.’

Biennial meeting American Pomological Society, Boston, Mass., September 10-12.—‘The Best Amateur Red Raspberry,’ ‘Progress in Horticulture in Ontario during the past Twenty-five years.’

Annual meeting, Ontario Fruit Growers’ Association, Leamington, Ont., November 24-26.—‘Hardy Fruits for Northern Districts.’

In addition to attending the above meetings, I visited the Toronto exhibition on September 7, and the Arnold Arboretum, and the Massachusetts Agricultural Experimental Station while at Boston, obtaining much information which will prove valuable to me in my work. I also visited the orchard of the Trappist fathers, La Trappe, Que., those of R. W. Shepherd, Como, Que., R. Brodie, Westmount, Que., and also Mr. W. W. Dunlop, Outremont, Que., and also drove sixty-five miles along the south shore of the St. Lawrence between St. Denis and Montmagny, having the opportunity at that time of visiting the orchards of J. C. Chapais, St. Denis, and Auguste Dupuis, Village des Aulnaies. At all these places there were new and interesting things to be seen and I got many suggestions for future work.

## ACKNOWLEDGMENTS.

As in past years, I have been greatly aided in my work by the fruit growers of Canada, who have been always ready to assist me. During the past year, when preparing a bulletin on plum culture, it was necessary to write to a large number of persons for information regarding varieties and methods of culture, and I always received courteous assistance. I take this opportunity of thanking those fellow workers for their ready and willing aid.

At the experimental farm, Mr. J. F. Watson and Mr. H. Holz have again proved themselves able assistants in the work, the former by the manner in which he has handled the correspondence and much of the office work, and the latter in his capacity as foreman, by his untiring and faithful supervision of the work outside.

*Donations.*—The horticultural division is favoured every year with donations of plants, scions, seeds, &c., from institutions, and persons who either desire to have them tested at the experimental farm or who send them merely as gifts to the institution. The horticulturist is always pleased to receive such donations and to give them a fair trial. In the case of seedling fruits, however, it is desirable to see the fruit and pass judgment upon it before accepting trees or scions, as by adopting this plan only the really promising kinds are tested.

The following donations were received during the year, and we beg to gratefully acknowledge the same:—

DONATIONS.

| Sender. | Donation. |
|---|---|
| Arnold Arboretum, Jamaica Plain, Mass | Seeds, collection of. |
| Bug Death Chemical Co., St. Stephen, N.B | Bug Death, 1 case of. |
| Baker, E. P., Kentville, N.S | Scions, Beauty of Horton apple. |
| Brodie, R., Montreal, Que | " Grand Duke Contantine apple. Burbank, Lachine and Brodie plums. |
| Ballantyne, James, Ottawa East, Ont | Scions, No. 2 seedling apple. |
| Beall, Thomas, Lindsay, Ont | " seedling apple. |
| Carter, J. H., Massawippi, Que | " Shiawassee Beauty apple. |
| Cass, C. A., L'Orignal, Ont | " of seedling apples. |
| Carstesen, Hans Peter, Billings Bridge, Ont | " Carstesen plum. |
| Cockburn, J. P., Gravenhurst, Ont | " Algonquin apple. |
| Dunlop, W. W., Outremont, Que | " and trees of Montreal seedling plums. |
| Dempsey, W. H , Trenton, Ont | " Hubbardston Nonsuch apple. |
| Fisk, J. M., Abbotsford, Que | " apple, Canada Baldwin, Stettin Red. |
| Greenfield, Samuel, Ottawa East, Ont | " seedling, apple and plums. |
| Gardener, James, Cornwall, Ont | " of unknown apple. |
| Graham, J. I., Vandeleur, Ont | " hardy peach. |
| Hamilton, Robert, Grenville, Que | Seeds of Japanese trees and vegetables. |
| Harkness, A. D., Irena, Ont | Scions, Red Fameuse apple. |
| Iowa Experimental Station, Ames, Ia | " Tatge and Ames plums, and Brilliant and Avista apples. |
| James, George, Lochlin, Ont | Tubers, James' Nugget potato. |
| Johnston, Asa., East Farnham, Que | Scions, apple. |
| Jack, N, E., Chateauguay Basin, Que | " May Queen plum. |
| Livingston, L. L., Frankville, Ont | Buds, seedling apple. |
| Little, E. E., Ames, Ia., U.S | Scions, apple and plums. |
| Lizotte, Rev. J., St. Jean des Chaillons, Que | " seedling apple. |
| Lagace, Jules, Fraserville, Que | " " |
| Messenger, R. J., Bridgetown, N.S | " " |
| Macoun, J. M., Ottawa, Ont | Seeds of Western plants. |
| Morgan, H. H., Manchester, N.H | Tubers, Morgan White and Morgan Seedling potatoes |
| Morrow, J. F., Calumet, Que | Scions, Seedling apple and Knudson cherry. |
| Newman, C. P., Lachine Locks, Que | " peach. |
| Reynaud, G., La Trappe, Que | " Perdrigon plum, Flemish Beauty pear. |
| Rowley, Joseph, Cummings Bridge, Ont | Trees, Rowley and No. 2 seedling plums. |
| Royal Botanic Gardens, Kew, England | Seeds, collection. |
| Shaw, R. M., Waterville, N.S | Plants, Big Bobs strawberry. |
| Scott, W. A., Montreal, Que | Buds, Blue Pearmain apple. |
| Saunders, W. E., London, Ont | 3 trees Betula lenta |
| Shepherd, R. W., Como, Que | Scions, Windsor Chief apple. |
| Stephens, C. L., Orillia, Ont | Seedling gooseberry ; Scions, hardy peach. |
| Tuttle, A., Clark, Baraboo, Wis., U.S | Scions, apple. |
| Whyte, R. B., Ottawa, Ont | Walnuts, 1 bushel. |
| Waugh, Prof. F. A., Amherst, Mass., U.S | Scions, Palmer Greening and Scarlet Cranberry apples. |

## APPLES.

The apple trees wintered well this year and there were fewer deaths than usual in the orchard. Vacancies were filled by new varieties and by additional trees of some kinds found desirable to grow in this district. The crop was below an average one, but the fruit was of good quality, there being no scab and little codling moth. There were 199 named varieties fruited this year, and of these there was a much larger proportion of winter apples than in previous years.

### SEEDLING AND CROSS-BRED APPLES.

This year 208 trees were added to the seedlings already planted, making a total of 1,596 now in the orchards. The first fruit among the seedlings planted in 1890 was borne this year when one Wealthy seedling bore three apples. In the Russian seedling orchard 31 trees bore which had never fruited before, making a total of 225 which have fruited altogether. Of these, twenty-seven have been thought worthy of propagation for trial in northern Ontario, and Manitoba and the North-west Territories, but practically none of them are sufficiently promising for districts where varieties already recommended succeed.

Some further work was done in cross-breeding apples, the varieties used for this purpose being McIntosh Red, Lawyer, Northern Spy, North-western Greening, and Milwaukee.

### TOP GRAFTING.

The work of top grafting the tenderer varieties on hardy stocks is continued and extended each year, as it is believed that this is a valuable line of work. Already 90 varieties have been top grafted. A tree of Northern Spy top grafted in 1893 bore over one barrel of apples this year. This variety has not proven satisfactory when grown as a standard tree.

### SHIPMENT OF APPLES TO GLASGOW IN COLD STORAGE.

As the trees in the apple orchard at the Central Experimental Farm get larger the crop naturally increases, and as there are in some cases a number of trees of each kind, a fair quantity of some varieties can now be obtained. Although most of the apples are sold on the Ottawa Fruit Exchange, it was thought that it might be profitable, and at the same time of interest to fruit growers, to send some to Great Britain. A small shipment of 100 bushel boxes of autumn apples, therefore, was made to Glasgow last year, with good profit. The results of this shipment, which were published in the Annual Report of 1902, interested a great many, and various letters of inquiry were received. These came especially from small growers, who were pleased to get in the report all the details regarding the shipping of the fruit, cost of boxes and other material, and the details regarding the rates charged on the steamer and on the other side of the Atlantic, as fruit growers who have but a small quantity to sell are reluctant to adopt a new plan without knowing all the particulars.

This year another small shipment, mostly of Duchess of Oldenburg, was made in cold storage, and although the profits were not quite as large as last year they were still above what could have been obtained here.

The fruit was sent by the steamer *Kastalia*, which sailed from Montreal on August 20, and arrived at Glasgow on August 31.

The apples were picked on August 13, 14, and 15, and brought under cover and packed in boxes, the inside measurement of which was: depth, 10½ inches, width, 11½ inches, length, 22 inches. The sides and top and bottom were made of three-eighth inch boards, and the ends of half-inch, dovetailed and glued. Only apples free from defects were selected. These were wrapped in tissue paper, and packed tightly in layers, a sheet of cardboard being put between each layer and a thin layer of Excelsior between the apples and the boards at top and bottom. There were four layers of fruit to a box. No Excelsior was used as packing among the apples, as different sized apples were used for this purpose. The apples when picked were practically full grown, well coloured, but still quite hard. The fruit was kept in a cool place until August 18, when it was taken to the station at Ottawa, and put on a freight car, which left for Montreal that night. The fruit arrived in Montreal early on the morning of August 19, but just reached the steamer before the cold storage compartments were closed in the evening. More time will be allowed another year, as the fruit might not have got into cold storage. The rate for cold storage and freight on the steamer was 30 shillings for 40 cubic feet.

Following is the account sales:—

43 and 44 BAZAAR AND COVENT GARDEN MARKET, 25 STIRLING ST., CITY.
GLASGOW, Septemebr 4, 1903.

Account sales of 90 boxes apples ex. *Kastalia.* Sold by Thomas Russell, by order and for account of Mr. W. T. Macoun, Central Experimental Farm, Ottawa:—

W. T. Macoun.

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| XXX......10 boxes North Star, 7 \| — ........ ....... | 3 | 10 | 0 | | | |
| 80 " Duchess, 5 \| 6 ............... | 22 | 0 | 0 | | | |
| | | | | 25 | 10 | 0 |
| *Charges.* | | | | | | |
| Freight on goods ....................... ............... | 7 | 5 | 2 | | | |
| Freight on empties, river and harbour dues, master porterage, landing, selecting, coopering, catalogues, advertising, &c., cartage to warehouse, housing and delivery ................................ ............. | 2 | 5 | 0 | | | |
| Commissioner and guarantee.... ............... ... .. | 1 | 5 | 6 | | | |
| | | | | 10 | 15 | 8 |
| Net proceeds.... ................................ | | | | 14 | 14 | 4=$71.29 |

The expenses of the shipment on this side of the Atlantic, exclusive of growing the fruit, picking, packing and sending to the car at Ottawa, which would be necessary in any shipment, were:—

| | |
|---|---|
| Cost of 90 boxes at Toronto, 14 cents..... ...... ...... | $12 60 |
| Freight on 90 boxes, Toronto to Ottawa.... ...... ...... | 2 05 |
| Cost of 63 lbs. Excelsior at 3 cents.... ...... ...... .... | 1 89 |
| Cost of 450 strips of cardboard........ ........ ........ | 2 70 |
| Cost of 4 reams of tissue paper at $1.25.... .... .... .... | 5 00 |
| Wrapping, 66 hours at 7½ cents an hour...... ...... .... | 4 95 |
| | $29 19 |

Leaving a net balance of $42.10, or approximately, 46·77 cents per box. There were about 180 apples in each box of Duchess, or about one-third of a barrel, thus making a net balance of, approximately, $1.40 per barrel. This is not a large profit, but it is a fair one, and better than would have been obtained at Ottawa by selling the fruit in baskets, barrels or boxes. In shipping large quantities of fruit the cost of material would be much less and the profits greater.

Following is the report of the government agent who saw this fruit sold at Glasgow:—

8 GLENBANK TERRACE,
LENZIE, N.B., September 7, 1903.

'These arrived at Glasgow on August 31 in very good condition, and were kept at a temperature of 35 to 40 degrees in refrigerator chamber during the voyage over. The 80 cases Duchess made 5s. 6d. a case. These showed up well for the variety, but several buyers complained to me about the lightness of the cases, which only weighed 36 pounds gross. This meant about 30 pounds of fruit in each case. The 10 cases North Star realized 7s. They were in excellent condition and looked well. I like the way you had these 10 cases packed, and think the sheet of cardboard between each layer with a little Excelsior top and bottom could not be improved upon.'

(Signed) JOHN BROWN,
*Inspector at Glasgow.*

Both this year and last, the complaint was made that the weight of fruit per box was too small. The Duchess is, however, a light apple and very little additional weight of fruit could have been obtained by another method of packing this variety.

## NEW OR LITTLE KNOWN VARIETIES OF APPLES.

A large number of varieties of apples have been already described in the reports of the 'Horticulturist.' The following five kinds have not been described in the reports before. All of these descriptions are original, having been made from specimens in the writer's possession, and all from fruit grown on the Central Experimental Farm:—

*Dempsey No. 80.*—Originated at Trenton, Ont., by the late P. C. Dempsey. A cross between Northern Spy and Golden Russet. Fruit roundish, regular; size above medium; cavity deep, narrow, slightly russeted; stem short, slender to moderately stout; basin medium depth and width, smooth; calyx partly open; colour pale yellowish green splashed and washed with deep reddish pink; dots few, large, indistinct; skin, thick, tough; flesh yellow, firm, juicy; core small; briskly subacid, not highly flavoured; quality above medium; season late winter; tree vigorous and bears young. A promising winter apple at Ottawa.

*Dudley (North Star).*—Originated in Maine. Fruit roundish; size large; cavity open, deep, slightly russeted; stem medium length, slender; basin deep, medium width, slightly wrinkled; calyx partly open; colour pale yellow; streaked and splashed with deep lively red; dots few, small, pale yellow, indistinct; skin moderately thick, tender; flesh yellow, rather coarse, tender, moderately juicy; core small; subacid, pleasant flavour, quality above medium, almost good; season late September to early winter. Tree vigorous and productive. This is about the same season as Wealthy, but does not keep as long. A handsome apple.

North-western Greening:—Originated in Wisconsin. Fruit large, roundish to roundish oblong, slightly conical, regular; cavity deep, medium width, sometimes more or less russeted; stem short, stout; basin medium depth and width; almost smooth; calyx open; colour green at first then greenish yellow when fully mature; dots indistinct; skin thick, tough; flesh yellowish, firm, moderately juicy; core medium, closed; mildly sub-acid, pleasant flavour; quality good. Season mid-winter to late winter. Tree hardy at Ottawa and a vigorous grower, but inclined to be top heavy, causing splitting of the trunk. Not an early bearer, but is eventually quite productive. The fruit is very symmetrical and has an attractive smooth skin. One of the most promising winter apples for the north.

*Rideau (Wealthy female X Duchess male).*—A cross-bred apple, originated at the Central Experimental Farm, by Dr. C. E. Saunders in 1894, and fruiting this year for the first time. Fruit roundish, angular; size medium to large; cavity deep, open; stem short, stout; basin deep, open; calyx open or partly open; colour pale yellow, well washed and splashed with bright crimson, especially on sunny side; dots numerous, small, indistinct; bloom none; skin moderately thick, tender; flesh yellowish, remarkably firm, coarse, juicy; core rather small; subacid, sprightly; aromatic, though not high flavoured; quality good; season late September. Resembles Duchess somewhat in outward appearance, but is longer. There is a suggestion of Wealthy in flavour and sprightliness. Shows indications of water-core. A handsome apple and may prove useful, as its season is between Duchess and Wealthy.

*Windsor Chief.*—Originated in Wisconsin. Fruit oblate to roundish, slightly angular; size medium to large; cavity shallow, open, more or less russeted; stem medium length, stout; basin medium depth and width, almost smooth; calyx open; colour yellow, well washed with dark red; dots few to medium, yellow, prominent; skin thick, tough; flesh yellowish, firm juicy; core small; mildly subacid, pleasant flavour; quality good, season late winter. Tree hardy, vigorous, productive. Fruit hangs well. A promising apple. A little too dark in colour.

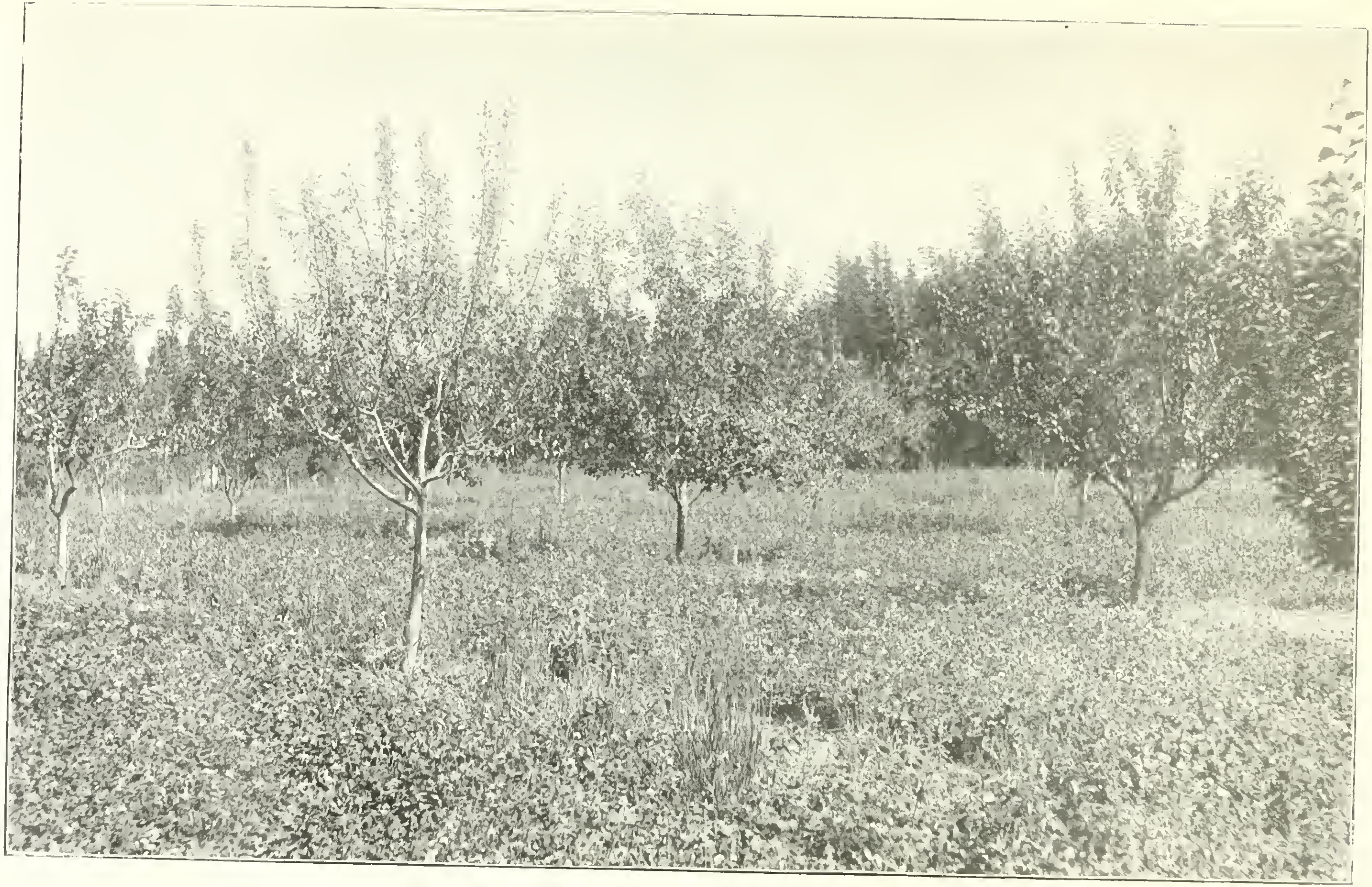
## SEEDLING FRUITS.

Quite a number of seedling fruits were again sent in for examination this year, most of which were apples, although pears, plums and peaches were also represented. In most cases full descriptions were made of the fruit, which will be useful for future reference. If the variety was considered promising, scions were asked for and those received will be grafted. As a result of this grafting of seedling varieties, every year there is now a large number of these growing at the experimental farm. As these fruit they are recommended for general planting or otherwise as their merits deserve.

We trust that fruit growers will continue to send in specimens of promising seedling fruits for examination.

Full descriptions follow of the best of those received.

| Record. | Province. | Address of Sender. | Description of Fruit. |
|---|---|---|---|
| | | | APPLES. |
| 250 | N. B. | Morley Small, Lawson | See full description. |
| 251 | Que | A. C. Kennesen, Dixville | Medium size, pale yellow, quality above medium, season autumn, not specially promising. |
| 252 | „ | Theodore Hanon, Mt. St. Hilaire | See full description. |
| 253 | „ | „ „ | Medium size, splashed with purplish red, fall, not promising. |
| 254 | „ | „ „ | Medium size, deep purplish red, early fall, not promising. |
| 255 | „ | R. Hamilton, Grenville | No. 1, above medium size, dark purplish red, medium quality, season October. |
| 256 | „ | „ „ | No. 2, above medium to large, yellow with purplish red on sunny side, quality above medium, season late September. |
| 257 | „ | „ „ | No. 3, medium size, yellow and reddish pink, good quality, season October, not attractive enough. |
| 258 | „ | „ „ | Medium size, bright purplish red, medium quality, season late fall. |
| 259 | „ | „ „ | Medium size, pale yellowish green with deep red on sunny side, quality good, season late autumn. Evidently Fameuse seedling. Not as good as Fameuse. |
| 260 | „ | „ „ | See full description. |
| 261 | „ | „ „ | Large, orange red, quality almost good, season October, not nearly as good as Wealthy. |
| 262 | „ | „ „ | Large, deep purplish red, quality above medium to good, season autumn, not of much promise. |
| 263 | „ | Rev. J. Lizotte, St. Jean des Chaillons | Medium size, deep crimson, quality above medium, season winter. |
| 264 | „ | Trappist Fathers, La Trappe | See full description. |
| 265 | Ont | Russell Hale, Orillia | Above medium size, yellow, splashed and washed with purplish red, quality good, season late winter, not of special merit. |
| 266 | „ | John Bertram, Dundas | Above medium size, pale yellow, splashed with bright purplish red, quality good, season early autumn, not sufficiently promising. |
| 267 | „ | M. G. Bruner, Olinda | Medium size, pale yellow, well washed and splashed with bright red, quality medium, season October, handsome but not promising. |
| 268 | „ | T. A. Harsant, Glen Orchard | Very large, washed and splashed with purplish red, quality below medium, season late autumn to early winter. |
| 269 | „ | W. J. Kerr, Renfrew | Large, green with splashes of purplish red, medium quality, season late autumn. |
| 270 | „ | „ „ | Medium size, sweet, medium quality, not promising. |
| 271 | „ | „ „ | Medium size, yellow with traces of purplish red, quality good but fruit not attractive, season early winter. |
| 272 | „ | F. Ballantyne, Smiths Falls | Medium size, pale yellow, quality medium, season probably mid winter. |
| 273 | „ | „ „ | Medium to below in size, bright red, quality good, season early winter, not large enough. |



ORCHARD PROTECTED BY NATURAL SHELTER BELT OF SPRUCE TREES. THE APPLE TREES WERE PLANTED IN 1897.

| Record. | Province. | Address of Sender. | Description of Fruit. |
|---|---|---|---|
| 274 | " | C. A. Cass, L'Orignal | See full description. |
| 275 | " | Thos. Connolly, Lindsay | " |
| 276 | " | C. H. Snow, Cummings Bridge | 'Sport' " |
| 277 | " | Daniel Lack, Lindsay | " |
| 278 | " | L. L. Livingston, Frankville | " |
| 279 | " | M. G. Bruner, Olinda | " |
| 280 | " | J. Ballantyne, Ottawa East | " |
| 281 | " | David Francis, Perth | Large, greenish yellow with a dull red blush, quality medium, season late winter. |
| 282 | " | C. Wallenshlager, New Edinburgh | Medium size, yellow with a pink blush, quality medium, season early winter, not desirable. |
| 283 | " | " " | Above medium size, pale green with pinkish blush, quality good, season mid to late winter, may be promising. |
| | | | PEARS, PLUMS AND PEACHES. |
| 284 | " | R. B. Martin, Elmira | Seedling pear, see full description. |
| 285 | " | W. J. Kerr, Renfrew | " " |
| 286 | P.E.I. | H. E. Wright, Summerside | Seedling plum " |
| 287 | Ont | Samuel Greenfield, Ottawa East | No. 1, seedling plum " |
| 288 | " | " " | No. 2 " large, dark purplish red, medium quality, season early September. |
| 289 | " | W. J. Diamond, Belleville | Seedling plum, medium size, dark, purplish red, quality good, season early September. |
| 290 | " | W. K. Ireland, Owen Sound | Seedling peach, see full description. |

No. 250—Seedling apple from Morley Small, Lawson, N.B.:—Size above medium to large; form roundish, conical, slightly angular; cavity shallow, medium width; stem short, stout; basin narrow, shallow, wrinkled; calyx partly open; colour greenish yellow well washed and splashed with red; dots fairly numerous, small, yellow, distinct; skin thick, tough; flesh yellowish, moderately juicy, mildly sub-acid; core medium; quality above medium; season mid to late winter.

Said to have originated from seed brought from England by Mr. Small's grandfather about eighty years ago. May be a promising late winter variety. Scarcely in condition for test yet, November 30, 1903.

No. 252—Apple: seedling, from Theodore Hanon, Mount St. Hilaire, Que.:—Size medium; form roundish conical; cavity medium depth and width, russeted, stem short, moderately stout; basin medium depth and width, slightly wrinkled; calyx partly open; colour pale yellow well washed with bright crimson; dots obscure; skin moderately thick, tender; flesh white tinged with red, juicy, tender, melting; core medium; mildly sub-acid, good flavour; quality very good; season evidently mid September.

A handsome apple and may be very useful as coming just before Wealthy.

No. 260—Apple seedling from R. Hamilton, Grenville, Que.:—Size above medium; form roundish; cavity medium depth, open, russetted; stem short to medium, stout; basin rather deep, medium depth and width, almost smooth; calyx open; colour pale greenish yellow well splashed and washed with rich purplish red; dots few, pale, indistinct; skin rather thick, tender; flesh yellowish, moderately juicy; core medium; sweet, sugary, pleasant flavour; quality good for a sweet apple; season evidently late September and October.

A handsome apple resembling Wealthy very much in outward appearance. October 16, still in good condition.

No. 264—Marlboro, seedling apple, from G. Reynaud, La Trappe, Que.:—Size large; form oblate; cavity deep, open, russeted at base; stem short, stout; basin, medium depth and width; calyx closed or open; colour pale yellow well washed with deep crimson and with purplish red splashes; dots fairly numerous, pale yellow, distinct; skin moderately thick, rather tough; flesh white, tinged with red, tender, juicy; core medium; sub-acid, pleasant flavour, but slightly astringent; quality good. Season early to mid-winter.

Tree is quite hardy and is bearing well. A very handsome apple of about the same season as Fameuse and McIntosh Red. It is somewhat like Canada Baldwin in flavour, and may be a seedling of that variety, as it resembles it somewhat in other respects.

No. 274.—Apple from C. A. Cass, L'Orignal, Ont.:—Size, above medium; form, roundish, conical ,angular; cavity narrow, medium depth; stem short, moderately stout; basin narrow, shallow to medium; calyx open; colour pale yellow, well washed and splashed with crimson; dots obscure; skin moderately thick, rather tough; flesh white, tender melting, juicy; core medium size, open; mildly subacid, good flavour; quality good to very good; season probably January and February.

Tree bore in 1902 for the first time. Nearly a barrel taken off.

Probably a seedling of Fameuse. Lacks sprightliness. Same season as McIntosh Red and Fameuse.

No. 275.—Seedling apple from Thos. Connolly, Lindsay, Ont.—Size large ; form oblate; cavity medium depth and width; stem short, stout; basin medium depth and width, smooth; calyx open; colour pale greenish yellow, with traces of pink on sunny side; dots moderately numerous, indistinct, grey and green; skin thick, tough; flesh yellow, crisp, juicy; core medium; subacid, sprightly, pleasant flavour; quality good; season probably early to mid-winter. A promising seedling.

No. 276.—Apple 'Sport,' from C. H. Snow, Cummings Bridge, Ont.:—Size above medium to large; form oblate; conic; cavity deep, open; stem short, stout; basin medium depth and width, wrinkled; calyx closed; colour greenish yellow, almost covered with dark red; dots moderately numerous, yellow, distinct; skin thick, rather tough; flesh white tinged with red, crisp, juicy, tender; core small; flavour subacid, pleasant; quality good to very good. Season early to mid-September.

Thought to be a sport of St. Lawrence, which it resembles in shape, flesh, and somewhat in flavour. The flavour, however, does not seem to be as high as St. Lawrence. Promising. Tree fruiting among a number of St. Lawrence trees procured from same nursery.

No. 277.—Apple seedling from Daniel Lack, Lindsay, Ont.:—Size large; form roundish; cavity shallow, open; stem short, stout; basin medium depth and width, almost smooth; calyx closed; colour pale greenish yellow, almost greenish white, with a bright pink blush on sunny side; dots fairly numerous; flesh white, crisp, tender, juicy; core small; mildly subacid, pleasant flavour; quality good. Season evidently mid to late September. November 4, 1903, still in condition. A promising variety, resembling Princess Louise in appearance and quality, but earlier. Evidently a seedling of Fameuse.

No. 278.—Apple from L. L. Livingston, Frankville, Ont.:—Size medium; form oblate; cavity open, russeted; stem short, stout; basin deep, open, slightly wrinkled; calyx open; colour greenish yellow, splashed and washed with dull purplish red; dots few, grey, distinct; skin thick, rather tough; flesh yellow, crisp, moderately juicy; core small; subacid, pleasant flavour; quality good. Season late winter. Would be more promising if a little larger.

No. 279.—Apple from M. G. Bruner, Olinda, Ont.:—Size medium; form oblate to roundish, slightly angular; cavity deep, narrow, heavily russeted; stem medium length, slender; basin medium depth and width, smooth; calyx open; colour yellow, well splashed, washed, and streaked with purple red; dots obscure; skin moderately thick, tough; flesh white, tender, fairly juicy; core small; subacid, good flavour; quality good; season early to mid-winter. Scarcely large enough or juicy enough to be very promising, although it has considerable merit.

No. 280.—Apple from Jas. Ballantyne, Ottawa East, Ont.:—Size medium; form oblate, conic; cavity deep, medium width; stem short, fairly stout; basin narrow, very shallow; calyx partly open; colour pale yellow, splashed and streaked with purplish red; dots obscure; skin moderately thick, tough; flesh white, firm, crisp, moderately juicy, subacid; core medium; quality above medium. Season, late winter.

No. 284.—Seedling pear from R. B. Martin, Elmira, Ont.:—Fruit large, obovate, ovate, obtuse pyriform; colour yellow, with an orange blush; skin thin, tender; flesh yellowish, tender, melting, buttery; moderately sweet, not high flavoured; core small; quality good. Season, late September. Not high enough flavoured to be among the best varieties.

No. 285.—Seedling pear from W. J. Kerr, Renfrew, Ont.:—Fruit medium size, obovate, obtuse; colour yellow with a faint pink blush; stem medium length, stout; flesh yellowish, juicy, buttery, sweet but, not high flavoured; quality good; season evidently early September. Promising if hardier than Flemish Beauty. Seedling of Bartlett. Originated in the county of Leeds. Tree, 20 feet high.

No. 286.—Abegweit. Plum seedling from Henry E. Wright, Summerside, P.E.I.: —Form round oval; size large; cavity medium depth and width; suture distinct, slightly depressed; apex slightly depressed; colour yellow, well covered with deep red dots obscure; bloom none on specimens received; skin moedrately thin, rather tough; flesh yellow, juicy; stone medium to below medium, oval, flattened, cling; sweet, rich flavour; quality very good. A handsome plum and one worth propagating. Raised from stone of a plum from California. Bore first time this year. Tree a fast grower, very healthy and hardy so far. Ripens a few days later than Moore's Arctic and earlier than Lombard. Tree 6 or 7 years old from seed. Domestica group.

No. 287.—Plum seedling No. 1, from Samuel Greenfield, Ottawa East, Ont.:—Form roundish oval (broad); size large; cavity shallow; suture indistinct, no depression; apex rounded; colour dark purplish red; dots numerous, small, yellow; skin thin, tough; flesh greenish yellow, juicy, sweet; stone large, oval, cling; sweet, good flavour; quality good to very good. A plum of the Bradshaw type. Tree fruiting well this year. Promising. Domestica group.

No. 290.—Seedling peach from W. K. Ireland, Owen Sound, Ont.—Fruit large, roundish, colour yellow, well washed with deep red; suture distinct, depressed, deepest towards the apex; skin moderately thick; flesh yellow, juicy, sweet, rich, good flavour. Quality very good. Season mid September.

## PEARS.

Although a few trees of named varieties of pears are still growing in the orchard, they are not at all satisfactory. Seedlings of Flemish Beauty and others are being grown, and it is hoped that some more blight resistant varieties may be obtained.

## PLUMS.

As usual, nearly all the flower buds of European plums were destroyed by winter. The spring frosts did some injury to the flowers of native plums, but the Americanas were not affected, and the crop of the latter was an average one as regards quantity, but the quality was not as good as usual, owing to the drought which weakened the trees and caused some of the foliage to fall; to the aphis which were very difficult to control, and to the brown rot which caused much injury, notwithstanding frequent spraying which was offset by the wet weather during the latter part of the summer, making the conditions very favourable for the development of the disease.A bulletin on plum culture was published this year, giving the results of experiments with plums up to date.

One new experimental farm seedling was named this year, of which the following is a description:—

Welcome (seedling of DeSoto).—Fruit above medium size, oval, flattened considerably; cavity narrow, shallow; colour rich yellow more or less washed with red; dots very small, yellow, indistinct; bloom thin; skin moderately thick, fairly tough; flesh yellow, juicy, sweet, a pleasant but not rich flavour; quality good; season mid September. A very handsome plum. Tree vigorous and productive.

## GRAPES.

Although the summer was cool and wet, the autumn was very favourable for the ripening of grapes, and 101 varieties matured this year. Among the newer varieties the Campbell's Early, which matures about the same time as Moore's Early, and is better in quality, is the best. For districts where the climate is like that at Ottawa, the following varieties are those which will give greatest satisfaction:—

Campbell's Early, Moore's Early, Moyer, Peabody, Wilder, Roger's 17, Delaware, Brighton, and Lindley. It is necessary to plant the last two among others, as they are not self fertile.

Several of Munson's hybrid grapes fruited this year. Of these the most promising is Manito, which is as early as Champion. The following description was made of it:—

*Manito*:—Vine medium growth, productive; fruit clusters below medium size, cylindrical, sometimes slightly shouldered and moderately loose; fruit below medium size, globular, black with a blue bloom; skin thin, fairly tender, somewhat acid; pulp very tender, melting, sweet, good flavour; quality good. As early as Champion. Promising for the north.

## CHERRIES.

The cherry crop was a failure this year owing to the winter killing of the flower buds and to spring frost. There were only a few scattered cherries on a few trees. The Orel 25, is the hardiest in flower bud of all the varieties yet tested, as this has given fair crops when others have had little or none. Cherries, like European plums, will succeed well when grown near large bodies of water, when in the interior where the temperature does not fall any lower the flower buds are destroyed by winter.

## STRAWBERRIES.

The strawberries wintered well and would probably have produced a fine crop but for the drought and spring frosts. As it was, the dry weather in April and May and until near the middle of June was very hard on the plants and they made little growth. The frosts of May 1 and 2, and particularly May 24 and 29, destroyed a large proportion of the flowers, the pistil being the part most injured. Many kinds set little or no fruit. The following table, in which are given the yields of the twenty-five most productive varieties, is instructive in that it shows which kinds were most resistant to the frost, but, as showing how much less was the yield of the most productive variety this year than last, the Mele, which was first, yielded 35 lbs. 6 ozs. in 1902, and the Lovett, which was 25th on the list, 20 lbs. 5½ ozs., while in 1903 the most productive variety, Jucunda Improved, yielded only 11 lbs. 15 oz., and the Young's seedling, which was 25th on the list, only 3 lbs. 11¼ oz. Of the 25 varieties which yielded best in 1903, 9 averaged best previous to 1903, and 10 were among the most productive 25 varieties in 1902.

For general market, the following are among the best:—Buster, P., Warfield, P., Beder Wood, B., Lovett, B., Sample, P., and for shipping long distances, the Williams, B. Other productive varieties for near market are: Bubach, P., Glen Mary, B., Greenville, P., and Haverland, P. The Clyde, B., is also a very productive berry, but as it has not very much foliage, is liable to scald, unless given high cultivation.

| Name. | Bisexual Pistillate. | Date of full bloom. | Date of first ripe fruit. | Date of first picking. | Date of last picking. | Number of pickings. | Total Yield 1903. — Length of Rows, 30 ft. Lbs. | oz. |
|---|---|---|---|---|---|---|---|---|
| Jucunda Improved | B | May 29.. | June 22.. | June 24.. | July 13.. | 8 | 11 | 15 |
| Irene | P | ″ 27.. | ″ 25.. | ″ 27.. | ″ 13 . | 7 | 10 | 4¾ |
| Swindle | P | ″ 26.. | ″ 27.. | ″ 29.. | ″ 13.. | 6 | 9 | 11½ |
| Buster | P | ″ 26.. | ″ 22.. | ″ 24.. | ″ 13.. | 7 | 9 | 8 |
| Thompson's Late | P | ″ 29.. | ″ 27.. | ″ 29.. | ″ 13.. | 6 | 9 | 5 |
| Splendid | B | ″ 29.. | ″ 22.. | ″ 24.. | ″ 10.. | 6 | 9 | 0 |
| Daniel Boone | P | ″ 26.. | ″ 22.. | ″ 24.. | ″ 13.. | 8 | 7 | 1 |
| Gandy | P | ″ 29 . | ″ 27.. | ″ 29.. | ″ 13.. | 6 | 6 | 12½ |
| John Little | P | ″ 26.. | ″ 22.. | ″ 24.. | ″ 13.. | 8 | 6 | 10 |
| Dora | P | ″ 29.. | ″ 22.. | ″ 24.. | ″ 13.. | 8 | 6 | 5¾ |
| Lovett | B | ″ 26.. | ″ 15.. | ″ 21.. | ″ 10.. | 9 | 6 | 4½ |
| World's Champion | B | ″ 29.. | ″ 22.. | ″ 27.. | ″ 13.. | 7 | 6 | 1½ |
| Vories | B | ″ 26.. | ″ 15.. | ″ 21.. | ″ 10.. | 8 | 6 | 1 |
| Wonderful | P | ″ 26.. | ″ 22.. | ″ 24.. | ″ 13.. | 8 | 5 | 12 |
| Brandywine | B | ″ 29.. | ″ 27.. | ″ 29.. | ″ 13.. | 6 | 5 | 10½ |
| Crescent | P | ″ 26.. | ″ 19.. | ″ 21.. | ″ 13.. | 9 | 5 | 10 |
| Williams | B | ″ 28.. | ″ 15.. | ″ 21.. | ″ 13.. | 9 | 4 | 11½ |
| Daisy | P | ″ 29.. | ″ 24.. | ″ 27.. | ″ 10.. | 6 | 4 | 7¾ |
| Carrie | P | ″ 26.. | ″ 15.. | ″ 21.. | ″ 13.. | 9 | 4 | 7¼ |
| Plover | P | ″ 28.. | ″ 26.. | ″ 27.. | ″ 13.. | 5 | 4 | 5 |
| Boynton | P | ″ 26.. | ″ 22.. | ″ 24.. | ″ 13.. | 8 | 4 | 4¾ |
| Howard's 41 | P | ″ 26.. | ″ 15.. | ″ 21.. | ″ 13.. | 8 | 4 | 4¼ |
| Scarlet Ball | P | ″ 29.. | ″ 27.. | ″ 29.. | ″ 13.. | 6 | 3 | 12¼ |
| Beder Wood | B | ″ 26.. | ″ 13.. | ″ 21.. | ″ 13.. | 9 | 3 | 11½ |
| Young's Seedling | B | ″ 29.. | ″ 15.. | ″ 24.. | ″ 13.. | 8 | 3 | 11¼ |

## RASPBERRIES.

Raspberries have never been very productive in the horticultural department at the experimental farm, as the soil is a little too light for that fruit and the canes are not as strong as they would be if grown in heavier soil. The lightness of the soil, however, is perhaps an advantage in testing varieties, as one is better able to learn which kinds are best than if the soil were very rich and heavy, when the variations would not be so great.

The canes came through last winter in very good condition, but the drought and spring frosts lessened the crop somewhat.

In the following table will be found the average yields of the twelve most productive red varieties under test for the past four years. The Brighton, which heads the list, is one of Dr. Saunders' seedlings, and is a very hardy variety. The Cuthbert only averaged 4 lbs. ½ oz. This variety does not succeed as well as many others at the Experimental Farm.

| Name of Variety.<br>—<br>Red Varieties. | Date of first ripe fruit, 1903. | Average date of first ripe fruit, 1900-03 | Date of first picking, 1903. | Average date of first picking, 1900-03. | Date of last picking, 1903. | Average date of last picking, 1900-03. | Number of pickings, 1903. | Average number of pickings, 1900-03. | Total yield, 1903. | | Average total yield, 1900-03. | | Length of row, feet. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Lbs. | oz. | Lbs. | oz. | |
| Brighton............ | July 1. | July 6. | July 2. | July 9. | July 27. | Aug. 4. | 12 | 11 | 28 | 6½ | 19 | 10½ | 36 |
| Kenyon............. | ″ 1. | ″ 10. | ″ 2. | ″ 12. | Aug. 10. | ″ 10. | 16 | 12 | 16 | 14¼ | 16 | 7 | 36 |
| Count....... ....... | ″ 1. | ″ 6. | ″ 2. | ″ 9. | July 27. | ″ 3. | 12 | 11 | 16 | 3 | 16 | 6¼ | 36 |
| Henry ........... . | ″ 1. | ″ 5. | ″ 2. | ″ 9. | ″ 29. | ″ 2. | 13 | 10 | 20 | 8½ | 16 | 0 | 36 |
| Clarke............... | ″ 5. | ″ 9. | ″ 7. | ″ 12. | Aug. 10. | ″ 12. | 13 | 13 | 12 | 12½ | 15 | 14½ | 36 |
| Marlboro.......... .... | ″ 5. | ″ 8. | ″ 7. | ″ 11. | July 31. | ″ 3. | 11 | 11 | 9 | 9½ | 14 | 10 | 36 |
| Phoenix............ | ″ 7. | ″ 11. | ″ 9. | ″ 15. | Aug. 20. | ″ 16. | 15 | 13 | 11 | 10¼ | 14 | 6½ | 36 |
| Herbert............. | ″ 7. | ″ 11. | ″ 9. | ″ 14. | ″ 13. | ″ 11. | 14 | 11 | 14 | 12¼ | 12 | 4¾ | 36 |
| Muriel........ .... | ″ 1. | ″ 7″ | ″ 2. | ″ 9. | July 27. | ″ 4. | 12 | 11 | 12 | 15½ | 12 | 1 | 36 |
| Reliance........ .... | ″ 1. | ″ 6. | ″ 2. | ″ 9. | Aug. 10 | ″ 9. | 16 | 13 | 14 | 8½ | 11 | 14 | 36 |
| Dora............... | ″ 9. | ″ 10. | ″ 11. | ″ 13. | ″ 10. | ″ 13. | 12 | 12 | 9 | 2¾ | 10 | 3½ | 36 |
| Brandywine......... | ″ 7. | ″ 13. | ″ 9. | ″ 15. | ″ 13. | ″ 19. | 14 | 14 | 12 | 5¼ | 9 | 15¼ | 36 |

## INDIVIDUALITY OF FRUITS.

The stock breeder has for a great many years paid especial attention to the individual animal in breeding for size, shape and markings, and for flesh and milk. In the writer's judgment, just as satisfactory results should be obtained in improving the strain of a variety of fruit, and although comparatively little has yet been done by horticulturists in this respect with fruits, much has been accomplished with flowers and vegetables. It is now recognized by the best authorities that each bud of a tree has individual characteristics which separate it from all other buds, and although the differences in buds are in most cases so slight that it is impossible to detect them, yet in some instances they may be quite marked.

Fruit growers have often noticed that one tree or bush is more productive than another, or bears larger, more highly coloured or better flavoured fruit. Take as an example the Fameuse apple. When this excellent old variety first bore fruit several hundred years ago one tree produced all the Fameuse apples that there were at that time. Some apples on that original tree were probably not as highly coloured as others, although exposed to the same amount of light. Some branches, probably, were more heavily laden than others, although there was no apparent reason why they should be. On some branches the fruit was larger though as well loaded as others. In time, scions were cut from that tree and grafted, and a new generation of Fameuse trees was the result. Were the trees thus produced identical in vigour and productiveness, and was the fruit borne on each of them exactly similar in every respect? We believe that they were not. Every bud on every tree of every generation of Fameuse apple trees had individual characteristics, and although the differences were rarely enough marked to see, there were doubtless always fine shades of variation. It does not need a great stretch of imagination to see that if such changes can be made, as have been made in live stock, flowers, vegetables, and other economic plants, by careful selection, that if, when that first generation of Fameuse apple trees began to bear, scions had been taken from the most productive tree bearing the finest coloured apples of the best size, that in the next generation of trees there would be at least a slight improvement, and if this selection had been carried on down to the present time we should have a better Fameuse than we have to-day. This selection, however, has not been carried out, and about all that has been done, in a few cases, is to graft from trees bearing highly coloured fruit, but as yet we have practically no reliable information in Canada as to whether the results have been satisfactory. In small orchards, where the fruit is intended for home consumption, the individuality of different trees is more noticed than in large orchards, where the record of each tree is not brought so prominently before the grower. The effect of the stock on the productiveness of the tree and characteristics of the fruit is not yet well understood. Whatever may be the influence of the stock there is no doubt that each variety maintains most of its individual qualities.

At the Central Experimental Farm the yields are kept from each individual tree in the orchard, making it possible to tell at the end of a certain period just what each tree has borne. It has been found that trees planted at the same time, and growing under practically the same conditions as other trees of the same variety, vary widely in productiveness. Some trees also bear a medium crop every year, while others bear a heavy crop every other year.

In the following table will be found the yields of trees of four varieties of apples for the past six years, with the total yield per tree for that time. It will be seen that some trees have yielded two to four times as much as others. The yield is given in gallons rather than in barrels, to avoid large fractions.

It is worth mentioning that of the 17 Wealthy trees in the table only 7 bore fruit this year, and of those that fruited, the tree which had borne regularly during the past four years, again bore a good crop in 1903.

### Apples—Wealthy.

(Planted 1896.)

*Yield in Gallons.*

| Tree. | 1899. | 1900. | 1901. | 1902. | 1903. | Total. |
|---|---|---|---|---|---|---|
| 1 | 1·0 | 2·25 | 2·75 | 15·0 | ....... | 21·00 |
| 2 | 2·0 | ·5 | 2·5 | 12·0 | ....... | 17·0 |
| 3 | 1·75 | 12·0 | 2·25 | 8·0 | ....... | 24·0 |
| 4 | 9·0 | 2·25 | 15·5 | 20·5 | 27·0 | 74·25 |
| 5 | 7·5 | 6·5 | 7·75 | 23·0 | 7·5 | 52·25 |
| 6 | 3·25 | 6·5 | 3·5 | 24·0 | ....... | 37·25 |
| 7 | 7·5 | 1·0 | 10·0 | 19·0 | 16·0 | 53·5 |
| 8 | ....... | 8·5 | ·5 | 21·5 | ....... | 30·5 |
| 9 | ....... | 11·25 | ·25 | 27·5 | ....... | 39·0 |
| 10 | 1·0 | 12·25 | ....... | 30·0 | ....... | 43·25 |
| 11 | 1·25 | 11·25 | ....... | 21·5 | ....... | 34·0 |
| 12 | ....... | 7·5 | ....... | 18·5 | 2·0 | 28·0 |
| 13 | 4·25 | 6·25 | 4·5 | 20·0 | ·5 | 35·5 |
| 14 | 2·5 | 5·5 | ·5 | 34·0 | ....... | 42·5 |
| 15 | ....... | 2·25 | 3·5 | 21·5 | 8·5 | 35·75 |
| 16 | 3·0 | 2·25 | 4·0 | 22·5 | 4·5 | 36·25 |
| 17 | ....... | 2·0 | 1·0 | 22·5 | ....... | 25·5 |

### Apples—McMahon White.

(Planted 1888.)

*Yield in Gallons.*

| Tree. | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. | Total. |
|---|---|---|---|---|---|---|---|
| 1 | 62·0 | ....... | 83·0 | 2·0 | 147·0 | 1·5 | 295·5 |
| 2 | 42·0 | 1·0 | 6·0 | 12·5 | 98·0 | 23·0 | 182·5 |
| 3 | 32·0 | 29·0 | 49·0 | 18·0 | 55·0 | 63·5 | 246·5 |
| 4 | 35·0 | ....... | 34·5 | 4·0 | 63·0 | 34·0 | 170·5 |
| 5 | ....... | 37·5 | 55·0 | 49·0 | ....... | 61·0 | 210·5 |
| 6 | 29·0 | 4·5 | 46·0 | ·5 | 69·5 | 43·0 | 192·5 |
| 7 | ·5 | 9·5 | 19·5 | 4·0 | 19·0 | 39·5 | 92·0 |
| 8 | 7·0 | 9·0 | 27·0 | 9·0 | 53·0 | 15·5 | 120·5 |

### Apples—McIntosh Red.

(Planted 1890.)

*Yield in Gallons.*

| Tree. | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. | Total. |
|---|---|---|---|---|---|---|---|
| 1 | 17·5 | 26·0 | 37·0 | 6·5 | 71·5 | 94·0 | 252·5 |
| 2 | 1·0 | 9·5 | 10·5 | 1·0 | 37·5 | 31·0 | 90·5 |

### Apples—Patten's Greening.

(Planted 1892.)

*Yield in Gallons.*

| Tree. | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. | Total. |
|---|---|---|---|---|---|---|---|
| 1 | 27·0 | 2·0 | 35·0 | 1·5 | 71·0 | 15·0 | 151·5 |
| 2 | 2·0 | 6·0 | 14·0 | 19·0 | 24·0 | 55·5 | 120·5 |
| 3 | 2·0 | 31·0 | 1·5 | 40·5 | 22·0 | 67·0 | 164·0 |
| 4 | 13·0 | ·0 | 6·5 | ·0 | 12·0 | 15·0 | 46·5 |
| 5 | 1·0 | ·0 | 19·0 | ·5 | 17·5 | 21·0 | 59.0 |

Experiments are now being conducted at the Experimental Farm by top grafting with scions from productive and unproductive trees, to determine how far the productiveness and unproductiveness of the trees is constant. Root grafted trees are also being grown for this purpose.

In order that fruit growers might learn, by personal experience, of the great variation in individual trees of the same variety, a co-operative experiment was begun this year. On application to the horticulturist, six pieces of zinc, bearing six consecutive numbers, were sent to each person. These pieces of zinc when received were to be attached to six bearing trees of a single variety of apple, pear, plum, or peach, the trees to be the same age, and growing under the same conditions of soil and culture. A record of the yield of each tree was to be kept for at least five years. A number of fruit growers in different parts of Canada have already joined this co-operative test, and it is hoped that more persons will desire to take part in this experiment.

If scions from productive trees will produce productive trees when grafted, and if scions from unproductive trees will produce trees which are poor croppers, it is very important that scions should be taken from the best yielding trees. As grafting will, in all probability, become much more general among fruit growers in the near future, the importance of knowing that trees vary widely in productiveness is easily seen.

## SPRAYING.

The spraying of fruit trees is not becoming as general as its importance deserves. The good results and profits from spraying have been proven over and over again, and yet only a small percentage of farmers with orchards spray their trees. The following is a statement made by Mr. Jos. Tweddle, of Fruitland, Ont., this year:—

'I have some 25 or 30 acres of apple orchard in bearing, mostly Greening, Spy and Baldwin. I figure on spraying three times a year, and estimate each spraying as adding a thousand dollars to the value of my crop. This is no mere guess work either.

The accuracy of the figures has been demonstrated, when owing to unfavourable weather conditions I have been unable to complete the work at the proper time. By spraying three times, I have got from 80 to 90 per cent of No. 1 apples from my total crop. I have sold 15 cars of apples of my own production in Germany, which have netted me $3 for No. 1, and $1.25 to $2 for No. 2.'

Spraying is now such an essential factor in successful orcharding, that the most economical means of applying the mixtures and solutions are being sought for. While the ordinary barrel pump is sufficient for smaller orchards, the power sprayer is evidently going to take its place in large orchards. Up to the present time compressed air sprayers appear to have given the best satisfaction, although gasoline engines have given very satisfactory results. In a demonstration of power spraying given by the Fruit Division of the Commissioner's branch with a gasoline engine, it was shown that it could do good work in spraying orchards. Mr. Jos. Tweddle, of Fruitland, Ont., used compressed air, which he said was also very satisfactory.

As a rule, the greater the number of sprayings, up to five or six, the better the results will be, but if a farmer or fruit grower finds it impossible to spray more than three times, the early sprayings are decidedly the most important. Although this is especially true in spraying to prevent the apple spot fungus, it is also true with other diseases.

The following formula is that recommended at the Central Experimental Farm for fungi on fruit trees:—

*Poisoned Bordeaux Mixture for Fungi and Leaf-eating Insects on Fruit Trees.*

| | |
|---|---|
| Copper sulphate (bluestone) | 4 lbs. |
| Unslaked lime | 4 lbs. |
| Paris green (for leaf-eating insects) | 4 oz. |
| Water (1 barrel) | 40 gals. |

Dissolve the copper sulphate in hot water, or by suspending it in a coarse bag in a wooden or earthen vessel containing 4 or 5 or more gallons of water. Slake the lime in another vessel. If the lime, when slaked, is lumpy or granular, it should be strained through coarse sacking or a fine sieve. Pour the copper sulphate solution into a barrel, or it may be dissolved in this in the first place; half fill the barrel with water; dilute the slaked lime with 8 or 10 gallons of water, and pour it into the copper sulphate solution, then fill the barrel with water and stir thoroughly. It is then ready for use. Do not pour the undiluted slaked lime into the undiluted copper sulphate solution, or vice versa, as when mixed in this way a poor, flakey Bordeaux mixture which settles rapidly is the result. A stock solution of copper sulphate and lime wash may be prepared and kept in separate covered barrels throughout the spraying season. The quantities of copper sulphate, lime and water should be carefully noted. Further particulars regarding other spraying mixtures and solutions may be found on the spraying calendar, which will be sent on application.

## DUST SPRAYING.

In the western states, particularly in the state of Missouri, where orchards are often on steep hillsides, and where water is sometimes scarce, fruit growers have been looking about for some easier way of applying fungicides and insecticides than by means of water, which is difficult to get, and more difficult to draw over the rough ground. Trees have been dusted with sulphur and other materials in the past, but copper sulphate had not been generally used in this way until tried in the west. Machines for spraying dust mixtures have been invented or old ones improved upon, and during the past few years dust spraying has been carried on in a number of commercial orchards in the western states, and quite satisfactory results have been obtained. Air slaked lime has been used in the place of water for carrying the fungicides and insecticides, although it, in itself, to a certain extent is both.

The formulæ recommended up to the present year were not entirely satisfactory, as they did not contain the copper in the same chemical condition as in Bordeaux mixture. Experiments were conducted by the chemist of the Missouri Experiment Station, and a dust is now recommended which is said to have the copper in the right chemical condition. The formula, with methods of preparation, is given in Bulletin No. 60, Missouri Experiment Station, Columbia, Mo., U.S.A.

A dust machine was obtained from the Ozark Sprayer Company, Springfield, Mo., and tested at the Experimental Farm this year. It was found to distribute the dust satisfactorily, but in order to get the dust to adhere to the leaves it must be applied when the dew is on the foliage. This is a serious drawback to dust spraying in this time of scarcity of labour. Moreover, the liquid spray gives such satisfactory results when properly made and applied, that the dust spray is not likely to take its place, except, perhaps, where the ground is rough, or where the orchards are on steep hillsides.

It would appear at first that there was great danger from the use of arsenical poisons when applied in a dust spray, but while there is undoubtedly danger if the dust is inhaled, the nozzle is so far away from the operator that there is really little or no danger if the work is carefully done.

## DISEASES OF FRUITS.

There are a few diseases of fruits which cause much more loss than others, and although these have already been discussed and remedies recommended many times, one cannot too often refer to them, as the endeavour to prevent and control them is by no means general yet.

*Apple spot fungus.*—The apple spot fungus, or apple scab, is still one of the commonest diseases in Canadian orchards, but it is one of the easiest to control, as the Bordeaux mixture, if thoroughly applied at the proper times, is very effectual. The most important sprayings are: 1st, just before or as buds start to develop; 2nd, just before blossoms open; 3rd, as soon as possible after blossoms fall. Also 4th, 5th, and even 6th, sprayings at intervals of ten days to two weeks after the 3rd spraying, if the first sprayings are not sufficiently effective.

In 1903 the spot was not as bad as usual, probably owing to the dry weather in spring and early summer, which was unfavourable to the development of spores. In eastern Ontario and most of the province of Quebec there was practically no spot, and the fruit was cleaner than it has been for years. Spraying should be thoroughly done in 1904, so as to endeavour to keep this fungus under better control, now that it has received a check. The experience of this year shows the importance of early spraying. Although the summer was a very wet one after the middle of June, no spot developed in the east.

*Ripe rot, brown rot.*—This disease does great injury every year to the peach and plum crop. It is not as easily controlled as the apple spot, but thorough spraying has been found very effectual. The ripe rot spreads by means of spores, which germinate early in the spring and penetrate the twigs from the leaves and flower buds on which they alight. In order to destroy as many of the spores as possible, all diseased fruit should be gathered and burned, whether it is on the ground or on the tree. This fruit harbours myriads of spores, which endure the winter, and are capable of infecting the trees the following spring. The trees should be thoroughly sprayed in time to destroy the spores before the disease penetrates the wood in the spring. The first spraying should be made with poisoned Bordeaux mixture, or a sulphate of copper solution, 1 pound sulphate of copper to 25 gallons of water, shortly before the buds start to develop, and with poisoned Bordeaux mixture just before the blossoms open. These sprayings are very important, and should never be neglected. After the trees have bloomed they should be thoroughly sprayed again with ordinary poisoned Bordeaux mixture, and also ten days to two weeks before the fruit begins to colour. The trees should also be sprayed with ammoniacal copper carbonate solution when the fruit is beginning to ripen. This will destroy the spores which appear in great numbers on the mature plums, and will not discolour the fruit. Plums and peaches which touch one another on the tree give very favourable conditions for the spread of the disease from one fruit to another. Being close together, moisture is retained on the skin, and the spores which may be on one fruit germinate readily and soon infect the next, and thus the disease spreads rapidly. Thinning the fruit makes the conditions much less favourable for the development of the disease. Also discoloured and dead wood should be cut out and burned in the meantime. If spraying is thoroughly done the injury from this disease will be much lessened.

*Peach-leaf curl.*—The leaf curl has been very troublesome in peach orchards during recent years, but it has been so well proven that it can be kept under control by spraying that peach growers need not now suffer much from this disease. The presence of the leaf curl is known early in the spring by the abnormal curling and swelling of the peach leaves. There is also frequently a whitish bloom accompanying these symptoms. Two early applications of Bordeaux mixture, if thoroughly applied, are all that are necessary; the first after the flower buds begin to swell and before they open, and the second, just after the blossoms fall.

*Black rot of the grape.*—Fruit growers in the south-western part of Ontario along Lake Erie are becoming discouraged in their efforts to grow profitable crops of grapes, owing to the prevalence of black rot fungus, which has done great damage there in recent years, and was again very bad in 1903, causing almost or quite a total loss of crop in some vineyards. This disease is very difficult to control, especially when it has gained such a foothold as it has in the south-western peninsula, but it can be controlled by spraying regularly year after year, as has been proven by experiments which have been made and by the results obtained by some commercial growers. The price obtained for grapes in Ontario is now so low that Canadian growers hesitate to spray as frequently as is recommended, and hence the disease is not checked. It has been found necessary to spray six or seven times in order to check the rot immediately. The first spraying should be made with a sulphate of copper solution (1 lb. of sulphate of copper to 25 gallons of water) before the bursting of the buds. The second spraying should be with poisoned Bordeaux mixture before the flowers open. This is a very important spraying, and if neglected may mean great loss from the rot. The third spraying should be made with poisoned Bordeaux mixture just after the blossoms fall, and the fourth spraying with the same mixture about two weeks later. There should then be from two to three sprayings with the ammonical copper carbonate solution at intervals of about two weeks.

## COVER CROPS.

Cover crops are now recognized to be so essential to the most successful culture of large fruits that it might seem like repetition to deal with them again, were it not for the fact that new information is being constantly obtained at the Central Experimental Farm as to the methods of growing these crops, to the kind of plants used for this purpose, to their relative value as plant food, and to their effect on the moisture content of the soil. Information regarding plant food and moisture-content will be found in the report of the Chemist, who has taken many samples for analysis from the orhcard.

The main uses of the cover crop in the orchard are: to hold the snow in winter and to protect the roots of the trees; to furnish vegetable matter to plough under in the spring for the purpose of obtaining humus and nitrogen, and to act as a catch crop in autumn to prevent leaching of plant food made available during the summer. Much has been written in former reports regarding the value of clover as a cover crop. The experiments this year were made to test other plants grown in a different way.

It is sometimes difficult to get a good stand of clover in the autumn, owing to dry weather after seeding time, and as in the north especially it is very desirable to have the cover crop as tall as possible so that it will hold the snow, some methods of ensuring a good growth were thought of, and it was decided to try growing a cover crop in drills. By adopting a plan of this kind it was thought that the seed could be sown comparatively early, and when it germinated the soil between the rows could be cultivated until the usual time, and thus conserve almost as much moisture as if the ground were bare, and yet a good cover crop would be sure to be established.

The kinds of plants used were horse beans, soja beans and hairy vetch, the two former being planted with the object of having something that would grow tall and hold the snow well. It was also observed in former years that the horse bean stood several degrees of frost, which is an advantage.

The seed was sown at two different dates, the object being to learn when was the best time for the purpose intended. All received two cultivations.

*Horse beans:* 1st sowing June 18. Sown at the rate of one bushel per acre, in rows 28 inches apart. These germinated well and grew rapidly, the cool weather of the past summer appearing to suit them well. By July 28, the plants were from 15 to 18 inches high, and were beginning to bloom. On September 21, a plot four feet square was cut, and the yield when still green was found to be at the rate of 7 tons 733 lbs. per acre. At this time the plants were 3 feet 6 inches to 4 feet in height, and in some places 4 feet 6 inches high, and although the ground between the rows was not covered with foliage, it was nearly so. The plants at this time were still growing and blooming profusely, and pods were well formed to a height of 2 feet 6 inches from the ground. By October 6 some of the plants were 5 feet in height. It was not until October 26 that the plants were much injured by frost, but they remained alive near the ground until the winter set in, November 16. At this time, November 30, the plants are standing up well, and it is expected they will hold the snow admirably. In the spring they will be harrowed or ploughed in, when, being leguminous plants, they will add much nitrogen to the soil.

*Horse beans:* 2nd sowing.—Sown June 26, at the rate of one bushel per acre in rows 28 inches apart. Up July 5. On September 21, the plants were 3 feet 6 inches in height. They were not so well podded as the first sown, but were healthy, in full bloom, and podded to a height of 2 feet 2 inches, and growing vigorously. Although not as tall as the first sown plants, they were tall enough to hold the snow well.

*Horse beans:* 3rd sowing. Sown July 7 at the rate of one bushel per acre in rows 28 inches apart. The plants reached a height of 3 feet and more, and should hold the snow well. They bloomed freely and pods were well formed before winter.

*Soja beans:* 1st sowing.—Sown June 18, at the rate of 37½ lbs. per acre in rows 28 inches apart. Owing to the cool summer, the soja beans did not make as rapid growth as they would otherwise have done, as they require plenty of heat, but the fall being warm they had good time to develop. On September 21, a plot four feet square was cut and the green crop found to weigh at the rate of 7 tons 350 lbs. per acre. At this time the plants were 2 feet to 2 feet 3 inches in height, and meeting between the rows in most places. The plants were well podded and still growing thriftily. At the first light frost, however, they were killed, as the Soja bean is very tender. The Soja bean should hold the snow well this winter, and will be valuable for turning under in spring.

*Soja beans:* 2nd sowing. Sown June 26 at the rate of 37½ lbs. per acre in rows 28 inches apart. Up July 2. On September 21, the plants were from 2 feet to 2 feet 3 inches in height and meeting between the rows in most places. The pods were not so well matured as the first sown, but otherwise there was very little difference between them.

*Soja beans:* 3rd sowing.—Sown July 7 in same manner as the others. By September 21, the plants were 2 feet to 2 feet 3 inches in height, having grown rapidly.

Vines were about as large as those of the first and second sowings, but the pods were not as well developed. This sowing was on warmer soil, which accounts for the rapid growth.

*Hairy vetch:* 1st sowing. Sown June 18 at the rate of 20 lbs. per acre and in rows 28 inches apart. The seed germinated well, and by the end of the first week of August the plants were meeting between the rows. On September 21, the length of the vines was 3 feet to 3 feet 6 inches in length. The vines formed a perfect carpet, and it was impossible to distinguish the rows. At this date a plot four feet square was cut, and the green crop was found to weigh at the rate of 11 tons 1,895 lbs. per acre. The Hairy Vetch continued to grow up to the time winter set in on November 16, only a few leaves here and there being injured by the earlier frosts. It had not begun to bloom when the growth was checked by winter. The Hairy Vetch will not hold the snow as well as the horse beans, but as it forms such a thick mat on the ground, the frost will probably not be so deep as where horse beans and Soja beans were grown; it makes a perfect mulch and will prevent thawing and freezing to a large extent. Furthermore, it is rich in plant food and is very valuable for turning under. The Hairy Vetch as a cover crop is a keen rival of red clover in this district, and under some conditions, such as where there is rough ground, will give better satisfaction.

*Hairy Vetch:* 2nd sowing.—Sown June 26, at the rate of 20 lbs. per acre, in rows 28 inches apart. Up July 2. By September 21 this had formed a thick mat, and the rows could not be distinguished, although the mat was not as thick as where the vetch was sown earlier. The vines at this date were 2 feet 6 inches to 3 feet in length. The cover was very satisfactory at this date, and by winter it was much better.

*Hairy Vetch:* 3rd sowing.—Sown August 7 in the same manner as at previous times. By winter the vines had formed a good mat, though this was not thick enough to be perfectly satisfactory, and as the autumn was favourable for growth this is a little too late to plant the hairy vetch as a cover crop here.

*Cost per acre of seed of cover crops, sown in drills,* 1903.

| | |
|---|---|
| Horse beans: 60 lbs. at 3⅓ cents per lb. | $2 00 |
| Soja beans: 37½ lbs. at 9 cents per lb. | 3 37½ |
| Hairy vetch: 20 lbs. at 9½ cents per lb. | 1 90 |

Common red clover sown broadcast, 12 lbs. per acre at 14 cents per lb. costs $1.68.

## LIST OF BEST VEGETABLES FOR FARMERS.

The list of best vegetables for farmers was omitted last year, as there were few changes to make. There are some changes to make this year, and as such lists are liable to get lost it is thought best to publish it again. Furthermore, owing to the limited number of pages available for reporting on the tests made, it is not possible to go into details with many kinds of vegetables. The following list gives in a concise form the names of the varieties considered best after many years' tests:—

*Asparagus.*—Conover's Colossal is the best all-round variety, but this variety is more subject to rust than Palmetto or Argenteuil.

*Beans.*—Keeney's Rustless Golden Wax, or Wardwell's Kidney Wax, for early crop; Early Refugee, for medium; and Refugee or 1,000 to 1, for late crop, are the most satisfactory dwarf varieties. Asparagus, Lazy Wife and Old Homestead are three of the best pole varieties.

*Beets.*—Egyptian Turnip, Eclipse and Bastian's Blood Turnip are three of the best varieties.

*Borecole or Kale.*—Dwarf Green Curled Scotch is the best.

*Broccoli.*—White Cape.

*Brussels Sprouts.*—Improved Dwarf is the most satisfactory.

*Cabbage.*—Early Jersey Wakefield (early). Succession (medium); Late Flat Dutch, Drumhead Savoy (late), Red Dutch (red), is a select list of the best varieties of cabbage. For extra early use Paris Market is desirable, being a week earlier than Early Jersey Wakefield.

*Cauliflowers.*—Extra Early Dwarf Erfurt and Early Snowball.

*Carrots.*—Chantenay is one of the best, but if a good extra early sort is required, the Early Scarlet Horn can be planted with advantage. It is a small variety.

*Celery.*—Golden Self-Blanching (Paris Golden Yellow), Improved White Plume, White Walnut (early); Perfection Heartwell, White Triumph, London Red (late), are among the best.

*Corn.*—Early Fordhook, Early Cory (early); Crosby's Early, Henderson's Metropolitan (second early); Perry's Hybrid, Stabler's Early, Early Evergreen, and Black Mexican (medium); Stowell's Evergreen, Country Gentleman (late). In planting, the Country Gentleman should not be omitted, as it lengthens the season very considerably, and is of fine quality.

*Cucumbers.*—Peerless White Spine or White Spine, Cool and Crisp, and Giant Pera are three of the most satisfactory slicing varieties. Boston Pickling is a good pickling sort.

*Egg Plants.*—New York Improved and Long Purple succeed best.

*Lettuce.*—Black Seeded Simpson, The Morse, and New York (curled), Improved Salamander, Unrivalled, Tennis Ball and Golden Queen (cabbage); Trianon and Paris Cos lettuce.

*Melons, Musk.*—Long Island Beauty, Hackensack and Montreal Market, of the Nutmeg type, and Surprise, Christiana and Emerald Gem, of the yellow fleshed types, are all good.

*Melons, Water.*—Cole's Early, Imperial, Ice Cream, and Phinney's Early are early water melons of excellent quality.

*Onions.*—Yellow Globe Danvers and Large Red Wethersfield are two of the best onions in cultivation.

*Parsnips.*—Hollow Crown and Dobbie's Selected are both good sorts.

*Parsley.*—Double Curled is as good as any.

*Peppers.*—Cayenne, Cardinal, Chili and Golden Dawn are four of the best.

*Pease.*—Gregory's Surprise, Gradus, American Wonder and Premium Gem (early); McLean's Advancer, Nott's New Perfection, and Heroine (medium). None of these are tall growing varieties. Stratagem, Juno (dwarf), Telephone (late). Excelsior is a promising second early sort.

*Potatoes.*—Extra Early: Early Ohio and Early Andes (pink), Bovee and Burpee's Extra Early (pink and white). Early: Everett and Rochester Rose (pink), Early Puritan (white). Main crop: Carman No. 1 (white), Empire State (white), Late Puritan (white), American Wonder (white), Dreer's Standard (white), Rural Blush (pink).

*Radishes.*—Early : Scarlet White-tipped Turnip, Rosy Gem, French Breakfast, Red Rocket (red) and Icicle (white). Late : White Strasburg, Long White Vienna. Winter: Long Black Spanish, Chinese Rose-coloured.

*Rhubarb.*—Linnæus and Victoria are the most satisfactory.

*Salsify.*—Long White and Sandwich Island.

*Spinach.*—Victoria and Thick-leaved are the best.

*Squash.*—Early: White Bush Scalloped and Summer Crook Neck. Late: Hubbard.

*Tomatoes.*—Early: Sparks' Earliana. Main crop: Brinton's Best, Trophy, Matchless (scarlet) and Burpee's Climax and Autocrat (purplish pink).

There are many varieties of tomatoes which are almost equal in excellence and productiveness.

*Turnips.*—Early: Extra Early Milan and Red Top Strap Leaf. Swedes: Champion Purple Top, Skirving's Improved.

## POTATOES.

Although the crop of potatoes was not as good as last year owing to the extremely dry weather in the early part of the summer, the largest yield, which was given by the Dreer's Standard, was at the rate of 534 bushels 36 lbs. per acre, and the lowest yield, that of the Red Rock, was only 19 bushels 48 lbs. per acre, a difference between highest and lowest in the 97 varieties under test of 514 bushels 48 lbs. per acre, which shows the great importance of planting only the most productive kinds.

The potatoes were planted in good sandy loam soil, which had been well manured for tobacco the previous year. The soil was ploughed in the fall and again in the spring and thoroughly harrowed with disc and smoothing harrow shortly before planting. Drills 2½ feet apart and about 4 inches deep were opened with the double mould board plough, and 66 sets of each variety were planted 1 foot apart in a single row. The sets were of good size, having at least three eyes and a liberal amount of flesh. The sets were injured somewhat by the dry weather and did not grow as evenly as usual. In some of the experiments, particularly in a spraying experiment, the sets came up too unevenly to get accurate results, hence these are omitted this year. The soil was harrowed once before the potatoes were above ground, to kill weeds, and then kept loose with the cultivator until the vines met. The potatoes were kept thoroughly sprayed to prevent injury from potato beetles and blight. The potatoes were planted on May 22, and dug on October 5 and 6.

## POTATOES—Test of Varieties.

| No. | Name of Variety. | Quality. | Total Yield per Acre. | | Yield per Acre of Marketable. | | Yield per Acre of Un-marketable. | | Colour. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Dreer's Standard | Good. | 534 | 36 | 508 | 12 | 26 | 24 | White. |
| 2 | Carman No. 1 | " | 514 | 48 | 499 | 36 | 24 | 12 | " |
| 3 | Late Puritan | " | 473 | 0 | 433 | 24 | 39 | 36 | " |
| 4 | Bergeron | Medium | 464 | 12 | 440 | 0 | 24 | 12 | White, pink eye |
| 5 | Canadian Beauty | Good | 451 | 0 | 402 | 36 | 48 | 24 | Pink and white. |
| 6 | Dakota Red | Medium | 442 | 12 | 398 | 12 | 44 | 0 | Red. |
| 7 | Rural Blush | Good | 440 | 0 | 411 | 24 | 28 | 36 | Pink. |
| 8 | Dr. Maercher | Medium | 429 | 0 | 391 | 36 | 37 | 24 | White. |
| 9 | Clay Rose | " | 418 | 0 | 387 | 12 | 30 | 48 | Pink. |
| 10 | Burnaby Seedling | Good | 418 | 0 | 376 | 12 | 41 | 48 | Pink and white. |
| 11 | Burnaby Mammoth | " | 415 | 48 | 385 | 0 | 30 | 48 | " " |
| 12 | American Giant | Medium | 411 | 24 | 341 | 0 | 70 | 24 | White. |
| 13 | Flemish Beauty | Good. | 402 | 36 | 360 | 48 | 41 | 48 | Bright pink. |
| 14 | Rose No. 9 | Medium | 398 | 12 | 385 | 0 | 13 | 12 | Pink. |
| 15 | Money Maker | Good. | 396 | 0 | 367 | 24 | 28 | 36 | White. |
| 16 | Uncle Sam | " | 393 | 48 | 367 | 24 | 26 | 24 | " |
| 17 | Everett | " | 393 | 48 | 356 | 24 | 37 | 24 | Pink. |
| 18 | State of Maine | " | 387 | 12 | 363 | 0 | 24 | 12 | White. |
| 19 | Peachblow | Medium | 385 | 0 | 341 | 0 | 44 | 0 | " |
| 20 | Troy Seedling | " | 374 | 0 | 330 | 0 | 44 | 0 | " |
| 21 | Seattle | " | 371 | 48 | 334 | 24 | 37 | 24 | " |
| 22 | Cambridge Russet | Good | 369 | 36 | 336 | 36 | 33 | 0 | " |
| 23 | I. X. L. | " | 367 | 24 | 334 | 24 | 33 | 0 | Pink and white. |
| 24 | Enormous | " | 363 | 0 | 330 | 0 | 33 | 0 | White. |
| 25 | Vanier | Poor to med | 358 | 36 | 323 | 24 | 35 | 12 | Red. |
| 26 | Seedling No. 7 | Medium | 356 | 24 | 332 | 12 | 24 | 12 | Bright pink. |
| 27 | Rural No. 2 | Good. | 352 | 0 | 321 | 12 | 30 | 48 | White. |
| 28 | Penn. Manor | | 347 | 36 | 323 | 24 | 24 | 12 | Pink and white. |
| 29 | Country Gentleman | | 347 | 36 | 303 | 36 | 44 | 0 | White. |
| 30 | Dooley | | 341 | 0 | 330 | 0 | 11 | 0 | |
| 31 | Irish Cobbler | Good | 338 | 48 | 299 | 12 | 39 | 36 | White. |
| 32 | Pearce | " | 334 | 24 | 301 | 24 | 33 | 0 | Pink and white. |
| 33 | Sabean's Elephant | " | 330 | 0 | 299 | 12 | 30 | 48 | White. |
| 34 | Mammoth Pearl | | 319 | 0 | 310 | 12 | 8 | 48 | " |
| 35 | Burpee's Extra Early | Good | 319 | 0 | 283 | 48 | 35 | 12 | Pink and white. |
| 36 | Doherty's Seedling | " | 316 | 48 | 297 | 0 | 19 | 48 | White. |
| 37 | Lee's Favorite | " | 312 | 24 | 297 | 0 | 15 | 24 | Pink. |
| 38 | Early Norther | " | 310 | 12 | 264 | 0 | 46 | 12 | " |
| 39 | Brown's Rot Proof | Medium | 305 | 48 | 272 | 48 | 33 | 0 | " |
| 40 | Swiss Snowflake | Good. | 305 | 48 | 268 | 24 | 37 | 24 | White. |
| 41 | Rochester Rose | " | 305 | 48 | 246 | 24 | 59 | 24 | Pink. |
| 42 | Delaware | " | 301 | 24 | 233 | 12 | 68 | 12 | White. |
| 43 | Vick's Extra Early | " | 299 | 12 | 270 | 36 | 28 | 36 | Pink and white. |
| 44 | New Queen | " | 292 | 36 | 264 | 0 | 28 | 36 | " " " |
| 45 | Early Elkinah | " | 292 | 36 | 259 | 36 | 33 | 0 | Pink. |
| 46 | Northern Beauty | | 292 | 36 | 257 | 24 | 35 | 12 | |
| 47 | Crimes Lightning | | 290 | 24 | 279 | 24 | 11 | 0 | |
| 48 | Irish Daisy | Good | 288 | 12 | 270 | 36 | 17 | 36 | White. |
| 49 | Jubilee | " | 286 | 0 | 257 | 24 | 28 | 36 | Pink and white. |
| 50 | Early Envoy | | 283 | 48 | 257 | 24 | 26 | 24 | |
| 51 | White Elephant | | 281 | 36 | 266 | 12 | 15 | 24 | Pink and white. |
| 52 | Montana Bluff | | 279 | 24 | 255 | 12 | 24 | 12 | White, bright pink eye. |
| 53 | Quaker City | | 272 | 48 | 242 | 0 | 30 | 48 | White. |
| 54 | Reeve's Rose | Good | 272 | 48 | 233 | 12 | 39 | 36 | Pink. |
| 55 | Early Ohio | " | 268 | 24 | 233 | 12 | 35 | 12 | " |
| 56 | Sir Walter Raleigh | | 268 | 24 | 233 | 12 | 35 | 12 | White. |
| 57 | Early Michigan | | 268 | 24 | 204 | 36 | 63 | 48 | " |
| 58 | Maule's Thoroughbred | | 266 | 12 | 222 | 12 | 44 | 0 | Pink. |
| 59 | Holborn Abundance | Medium | 261 | 48 | 253 | 0 | 8 | 48 | White. |
| 60 | Green Mountain | Good | 259 | 36 | 222 | 12 | 37 | 24 | " |
| 61 | Carman No. 3 | " | 253 | 0 | 228 | 48 | 24 | 12 | " |
| 62 | McIntyre | Medium | 253 | 0 | 228 | 48 | 24 | 12 | White and purple. |
| 63 | Napoleon | Good | 246 | 24 | 222 | 12 | 24 | 12 | Pink. |
| 64 | Maggie Murphy | Medium | 242 | 0 | 209 | 0 | 33 | 0 | Bright pink. |
| 65 | Snowball | | 242 | 0 | 195 | 48 | 46 | 12 | White. |

## POTATOES—Test of Varieties—*Continued.*

| No. | Name of Variety. | Quality. | Total Yield per Acre. | | Yield per Acre of Marketable. | | Yield per Acre of Unmarketable. | | Colour. |
|---|---|---|---|---|---|---|---|---|---|
| | | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | |
| 66 | Livingston | | 242 | 0 | 200 | 12 | 41 | 48 | White, pink eye. |
| 67 | Burbank's Seedling | Good | 239 | 48 | 189 | 12 | 50 | 36 | White. |
| 68 | Wonderful | | 231 | 0 | 204 | 36 | 26 | 24 | |
| 69 | Brosseau | | 224 | 24 | 198 | 0 | 26 | 24 | Red and white. |
| 70 | Polaris | Good | 215 | 36 | 187 | 0 | 28 | 36 | White. |
| 71 | Dublin Prize | | 213 | 24 | 178 | 12 | 35 | 12 | |
| 72 | Early Rose | Good | 209 | 0 | 169 | 24 | 39 | 36 | Pink. |
| 73 | Rawdon Rose | | 202 | 24 | 184 | 48 | 17 | 36 | Pink and white. |
| 74 | Wall's Orange | | 200 | 12 | 178 | 12 | 22 | 0 | Yellow, purple eye |
| 75 | Sharpe's Seedling | Good | 193 | 36 | 162 | 48 | 30 | 48 | Pink and white. |
| 76 | Juana | | 191 | 24 | 149 | 36 | 41 | 48 | |
| 77 | Early Puritan | Good | 189 | 12 | 149 | 36 | 39 | 36 | White. |
| 78 | Van Orman's Earliest | | 184 | 48 | 173 | 48 | 11 | 0 | |
| 79 | Empire State | Good | 180 | 24 | 165 | 0 | 15 | 24 | White. |
| 80 | General Gordon | " | 180 | 24 | 154 | 0 | 26 | 24 | Pink. |
| 81 | Up-to-Date | " | 180 | 24 | 154 | 0 | 26 | 24 | White. |
| 82 | Pink Eye | | 180 | 24 | 136 | 24 | 44 | 0 | White, bright pink eye. |
| 83 | American Wonder | Good | 169 | 24 | 143 | 0 | 26 | 24 | White. |
| 84 | Early Sunrise | " | 169 | 24 | 129 | 48 | 39 | 36 | Pink. |
| 85 | Prolific Rose | | 162 | 48 | 134 | 12 | 28 | 36 | Pink. |
| 86 | Eureka Extra Early | | 162 | 48 | 129 | 48 | 33 | 0 | |
| 87 | Seedling No. 2. (D. Murray). | | 162 | 48 | 101 | 12 | 61 | 36 | |
| 88 | Bliss Triumph | | 140 | 48 | 103 | 24 | 37 | 24 | Red. |
| 89 | Early St. George | Good | 121 | 0 | 107 | 48 | 13 | 12 | Pink and white. |
| 90 | Silver Dollar | | 114 | 24 | 83 | 36 | 30 | 48 | White. |
| 91 | Bovee | Good | 103 | 24 | 88 | 0 | 15 | 24 | Pink and white. |
| 92 | Early Summer | | 85 | 48 | 77 | 0 | 8 | 48 | " " |
| 93 | Early White Prize | Good | 57 | 12 | 57 | 12 | | | White. |
| 94 | Pingree | | 37 | 24 | 28 | 36 | 8 | 48 | |
| 95 | Early Andes | Good | 33 | 0 | 19 | 48 | 13 | 12 | Pink. |
| 96 | Pat's Choice | | 30 | 48 | 26 | 24 | 4 | 24 | |
| 97 | Red Rock | | 19 | 48 | 19 | 48 | | | Red. |

### ADDITIONAL VARIETIES OF POTATOES TESTED IN 1903.

The following varieties, some of which were sent for test, were grown in smaller plots:—

| Name of Variety. | Number of Sets Planted. | Total Yield per Acre. | | Yield Per Acre of Marketable. | | Yield per Acre of Unmarketable. | |
|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| Morgan seedling | 20 | 522 | 43 | 450 | 7 | 72 | 36 |
| Vermont Gold Coin | 21 | 477 | 6 | 456 | 21 | 20 | 45 |
| Morgan White | 20 | 392 | 2 | 363 | .. | 29 | 2 |
| John Bull | 6 | 387 | 22 | 338 | 48 | 48 | 24 |
| Quick Crop | 22 | 369 | 12 | 316 | 48 | 59 | 24 |
| Hammond's Wonderful | 10 | 333 | 57 | 319 | 26 | 14 | 31 |
| Clark's Pride | 9 | 322 | 40 | 274 | 16 | 48 | 24 |
| Nott's Peachblow | 22 | 303 | 36 | 264 | .. | 39 | 36 |
| Peck's Early | 22 | 303 | 36 | 264 | .. | 39 | 36 |
| Rough Coat Cup | 60 | 229 | 54 | 159 | 43 | 70 | 11 |
| Early Carter | 60 | 227 | 29 | 196 | 1 | 31 | 28 |
| Vick's No. 9 | 8 | 217 | 48 | 181 | 30 | 36 | 18 |
| Daybreak | 4 | 217 | 48 | 181 | 30 | 36 | 18 |
| James' Nugget | 42 | 186 | 41 | 79 | 31 | 107 | 19 |
| Todd's Seedling | 20 | 65 | 21 | 43 | 34 | 21 | 47 |

### TWELVE BEST YIELDING VARIETIES OF POTATOES—AVERAGE OF FOUR TO NINE YEARS.

| Name of Variety. | Average Yield per Acre. | | Name of Variety. | Average Yield per Acre. | |
|---|---|---|---|---|---|
| | Bush. | Lbs. | | Bush. | Lbs. |
| 1. Late Puritan, 9 yrs. | 436 | 32 | 7. Carman No. 1, 9 yrs. | 398 | 4 |
| 2. Holborn Abundance, 9 yrs. | 408 | 10 | 8. Burnaby Seedling, 8 yrs. | 394 | 44 |
| 3. American Wonder, 9 yrs. | 401 | 28 | 9. Country Gentleman, 5 years | 392 | 2 |
| 4. Uncle Sam, 4 yrs. | 401 | 8 | 10. Rose No. 9, 7 years | 390 | 29 |
| 5. Dreer's Standard, 9 yrs. | 398 | 50 | 11. Money Maker, 9 yrs. | 386 | 36 |
| 6. Penn Manor, 5 yrs. | 398 | 38 | 12. State of Maine, 9 yrs. | 379 | 48 |

An average crop for the twelve varieties of 399 bush. 13 lbs. per acre.

The above table was taken from bulletin No. 44, prepared by Dr. Wm. Saunders and Dr. C. E. Saunders.

## EXPERIMENTS WITH CORN.

In the following table will be found the average results from testing varieties of sweet corn for the past five years. Although many varieties have been tested, those in the table have proven the most productive. The soil in which the corn was planted this year was a light sandy loam on which vegetables were grown in 1902. The soil received a good dressing of rotted barnyard manure in the spring of 1903, and was then ploughed and thoroughly harrowed. The corn was planted on May 23 in hills three feet apart each way. About six kernels were planted in a hill. After germination had taken place and danger from cut-worms was over, the number of plants in a hill was reduced to four, twenty-four hills of each variety were planted, but twelve average hills of each were used for comparison. The corn was kept thoroughly cultivated during the summer.

| Name of Variety | Fit for use, 1903. | Average date fit for use, 1899-1903. | Height, 1903. | | Length of ears, 1903. | Average length of ears, 1899-1903. | Marketable ears from 12 hills, 1903. | Average number of marketable ears from 12 hills, 1899-'03. |
|---|---|---|---|---|---|---|---|---|
| *Early.* | | | feet. | in. | Inches. | Inches. | | |
| Early Fordhook | Aug. 19 | Aug. 17 | 5 | | 5 | $6\frac{1}{5}$ | 57 | 60 |
| Extra Early Cory | ″ 22 | ″ 18 | 5 | 7 | 6 | $6\frac{2}{5}$ | 48 | 57 |
| Burbank's Early Maine | ″ 22 | ″ 19 | 5 | 4 | 7 | 7 | 41 | 57 |
| Lackey's Early Sweet | ″ 27 | ″ 19 | 5 | | 6 | $6\frac{3}{5}$ | 48 | 56 |
| Ford's Early | ″ 28 | ″ 19 | 5 | 10 | $6\frac{1}{2}$ | 7 | 62 | 56 |
| Early Marblehead | ″ 19 | ″ 17 | 5 | 6 | $6\frac{1}{2}$ | $6\frac{4}{5}$ | 34 | 47 |
| *Second Early.* | | | | | | | | |
| Crosby's Extra Early | Sept. 5 | Aug. 29 | 7 | 2 | 7 | $6\frac{3}{5}$ | 38 | 58 |
| Metropolitan | ″ 8 | ........ | 6 | 8 | 7 | $7\frac{1}{5}$ | 56 | 51 |
| Early Giant Sweet | ″ 5 | Aug. 30 | 6 | 7 | 7 | $7\frac{3}{10}$ | 47 | 50 |
| Kendall's Early Giant | Aug. 31 | ″ 28 | 5 | 2 | 6 | $6\frac{9}{10}$ | 37 | 49 |
| Child's Honey Dew | Sept. 5 | ″ 31 | 7 | 1 | 7 | $7\frac{2}{5}$ | 45 | 48 |
| Shaker's Early | ″ 10 | Sept. 2 | 7 | 4 | 7 | $7\frac{9}{10}$ | 35 | 45 |
| *Medium.* | | | | | | | | |
| Black Mexican | Sept. 15 | Sept. 6 | 6 | 10 | 7 | $7\frac{1}{5}$ | 75 | 68 |
| Stabler's Early | ″ 12 | ″ 6 | 7 | | 7 | $7\frac{1}{2}$ | 53 | 52 |
| Perry's Hybrid | ″ 10 | ........ | 7 | 2 | $7\frac{1}{2}$ | $7\frac{4}{5}$ | 44 | 47 |
| Moore's Early Concord | ″ 12 | Sept. 5 | 6 | 7 | $7\frac{1}{2}$ | $7\frac{3}{5}$ | 44 | 47 |
| Early Evergreen | ″ 12 | ........ | 7 | 2 | $7\frac{1}{2}$ | $7\frac{1}{5}$ | 52 | 43 |
| *Late.* | | | | | | | | |
| Zig-Zag Evergreen (1899-1902) | ........ | Sept. 10 | ........ | | ........ | $7\frac{1}{4}$ | ....... | 49 |
| Country Gentleman | Sept. 20 | ″ 14 | 7 | | 6 | $6\frac{7}{10}$ | 36 | 47 |
| Columbus Market | ″ 20 | ″ 13 | 8 | 6 | 8 | 9 | 46 | 42 |
| Shoe Peg (Ne Plus Ultra) | ″ 20 | ″ 14 | 7 | 3 | 6 | $6\frac{4}{5}$ | 39 | 40 |
| Mammoth Sweet | ″ 17 | ″ 14 | 7 | 6 | $7\frac{1}{2}$ | 8 | 52 | 40 |
| Stowell's Evergreen | ″ 20 | ........ | 7 | 5 | $7\frac{1}{2}$ | $7\frac{3}{5}$ | 25 | 34 |

## TOMATOES.

This was an unfavourable season for tomatoes, and the yields in consequence were not large. The spring frosts destroyed many plants in this neighbourhood, and the wet, cool weather of most of the summer prevented much fruit from ripening on those plants which did escape the frost. At the Experimental Farm the plants were not set until after the frosts were over. If it had not been for the warm weather in September and October the yields would have been very much less than they were. A season like the past one brings out the value of the varieties of tomatoes which ripen their fruit early. The reader's attention is directed to the table in which is given the six varieties which ripened the most fruit previous to August 15. These are taken from a collection of 90 varieties tested this year. In this table it will be found that the Sparks Earliana yielded at the rate of 1,701 lbs. 9 oz. per acre before August 15. Between the

Early Ruby and the Sparks Earliana there is a difference in favour of the latter variety of 510 lbs. 8 oz. per acre. Tomatoes were selling in Ottawa on August 15, 1903, at 80 to 90 cents a pail, and before this date at higher prices. Taking the price at 80 cents a pail, and 20 lbs. of tomatoes to the pail, we have a difference in favour of Sparks Earliana of $20.42 per acre, and this in comparison with Early Ruby, which is also a very early variety, but not as smooth as Sparks Earliana. The Comrade did even better than the Sparks Earliana, but this is unusual, while the Sparks Earliana has always been very early and is recommended as the best early variety yet tested.

The seed of the tomatoes grown this year was sown in hot beds on March 24; the young plants were pricked out into strawberry boxes on April 17, and planted in the open ground on June 3, four by four feet apart each way, five plants of each variety being set. The soil was a light sandy loam which had been well manured for corn the previous year. The soil was kept cultivated until the growth of the vines prevented it.

TOMATOES—TWELVE BEST YIELDING VARIETIES, 1903.

| Name of Variety. | Date of First Ripe Fruit, 1903. | Yield of Ripe Fruit to Aug. 15, 1903—five plants. | | Total Yield of Ripe Fruit per acre to Aug. 15, 1903. | | Total Yield of Ripe Fruit, five plants, all pickings 1903. | | Total Yield of Ripe Fruit per plant, 1903. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Lbs. | oz. | Lbs. | oz. | Lbs. | oz. | Lbs, | oz. | |
| Atlantic Prize.......... | Aug. 1. | 1 | 4 | 680 | 10 | 114 | 4 | 22 | 14 | Medium size, wrinkled to almost smooth, scarlet. |
| Canada Victor.......... | July 21. | 1 | 8 | 816 | 12 | 91 | .. | 18 | 3 | Medium size, wrinkled, scarlet. |
| Dominion Day.... ..... | Aug. 29. | .. | .. | .. | .. | 90 | 8 | 18 | 2 | " " " |
| Early Bermuda. . . . . . | " 29. | .. | .. | .. | .. | 81 | 4 | 16 | 4 | " " " |
| Extra Early Advance ... | July 16. | 1 | 7 | 782 | 11 | 78 | 3 | 15 | 10 | Below medium size, smooth, scarlet. |
| Nolt's Earliest......... | " 16. | 1 | 7 | 782 | 11 | 74 | 6 | 14 | 14 | Medium size, wrinkled, scarlet. |
| Early Bird ...... ..... . | " 17. | 2 | 3 | 1,191 | 1 | 73 | 11 | 14 | 12 | Below medium size, smooth, purplish pink. |
| Thorburn's Earliest .. . | " 21. | 1 | 8 | 816 | 12 | 71 | .. | 14 | 3 | Medium size, wrinkled, scarlet. |
| Bright and Early ...... | Sep. 1. | .. | .. | .. | .. | 68 | .. | 13 | 10 | Below medium size, smooth, scarlet. |
| Maule's Earliest ....... | Aug. 1. | 1 | .. | 544 | 8 | 67 | 12 | 13 | 9 | Medium size, wrinkled, scarlet. |
| Quicksure... .... ...... | July 20. | 2 | 6 | 1,293 | 3 | 66 | 14 | 13 | 6 | Medium size, wrinkled to almost smooth, scarlet. |
| Extra Early Red.... ... | " 16. | 2 | 3 | 1,191 | 1 | 64 | 11 | 12 | 15 | Below medium size, smooth, scarlet. |

TOMATOES—SIX EARLIEST VARIETIES, 1903.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Comrade ................ | July 16. | 3 | 12 | 2,041 | 14 | 32 | 8 | 6 | 8 | Medium to below medium size, smooth, scarlet. |
| Sparks' Earliana (C.E.F.) | " 16. | 3 | 2 | 1,701 | 9 | 52 | 3 | 10 | 7 | Medium size, half wrinkled to smooth, scarlet. |
| Burpee's Climax........ | " 18. | 3 | .. | 1,633 | 8 | 46 | 4 | 9 | 4 | Medium size, smooth, purplish pink. |
| Sparks' Earliana........ | " 20. | 2 | 12 | 1,497 | 6 | 49 | 12 | 9 | 15 | Medium size, half wrinkled to smooth, scarlet. |
| Frogmore Selected . .. | " 16. | 2 | 6 | 1,293 | 3 | 38 | 2 | 7 | 10 | Below medium size, almost smooth, scarlet. |
| Quicksure .... ......... | " 20. | 2 | 6 | 1,293 | 3 | 66 | 14 | 13 | 6 | Medium size, wrinkled to almost smooth, scarlet. |
| Early Ruby. . ......... | " 17. | 2 | 3 | 1,191 | 1 | 46 | 4 | 9 | 4 | Medium size, half wrinkled to smooth, scarlet. |

SIX BEST YIELDING WRINKLED VARIETIES—AVERAGE FOR FIVE YEARS OR MORE.

| Variety. | Number of Years. | Average Date of First Ripe Fruit. | Average Yield per plant. Lbs. | oz. | Remarks. |
|---|---|---|---|---|---|
| Dominion Day | 5 | Aug. 7. | 17 | 12 | Medium size, wrinkled, scarlet. |
| Early Bermuda | 8 | " 9. | 16 | 14 | " " " |
| Canada Victor | 8 | " 4. | 16 | 6 | " " " |
| Maule's Earliest | 5 | " 4. | 16 | 1 | " " " |
| Money Maker | 8 | " 3. | 14 | 14 | " " " |
| Conqueror | 8 | " 1. | 14 | 3 | " " to smooth, scarlet. |

TWELVE BEST YIELDING SMOOTH VARIETIES—AVERAGE FOR FIVE YEARS OR MORE.

| Variety. | Number of Years. | Average Date of First Ripe Fruit. | Lbs. | oz. | Remarks. |
|---|---|---|---|---|---|
| Bright and Early | 7 | Aug. 12. | 16 | 9 | Below medium size, smooth, scarlet. |
| Bond's Early Minnesota | 8 | July 31. | 15 | 6 | " " purplish pink. |
| Early Bird | 5 | Aug. 2. | 15 | 5 | " " " |
| Atlantic Prize | 8 | " 4. | 15 | 3 | Medium size, smooth to almost smooth, scarlet. |
| Extra Early Advance | 8 | " 3. | 15 | 2 | Below medium size, smooth, scarlet. |
| Early Ruby | 8 | July 29. | 14 | 7 | Medium size, half wrinkled to smooth, scarlet. |
| Freedom | 6 | Aug. 3. | 14 | 1 | Medium to below medium size, smooth, scarlet. |
| Extra Early Red | 5 | " 1. | 13 | 12 | Below medium size, smooth, scarlet. |
| Burpee's Climax | 5 | " 8. | 13 | 1 | Medium size, smooth, purplish pink. |
| Comrade | 8 | " 4. | 13 | .. | Medium to below medium size, smooth, scarlet. |
| Brinton's Best | 8 | " 12. | 12 | 14 | Medium to large, smooth, scarlet. |
| Autocrat | 8 | " 16. | 12 | 14 | Medium to above medium size, smooth, purplish pink. |

## PEASE—EXPERIMENTS FOR COMPARISON OF YIELDS AND QUALITY.

During the past six years more than 160 so-called varieties of pease have been tested in the horticultural division. Some of these have been found to be synonyms, and a large number of them have proven inferior to a few of the best varieties. Notes are taken on the time of maturing, productiveness, quality, and length of vine of the different varieties, and four years ago some of the best kinds were selected for test in large plots. This test was continued this year. Twelve hundred selected peas of 23 varieties were sown in drills 100 feet long and 2½ feet apart on May 6. Notwithstanding the extreme drought, the pease germinated well and there was a good stand. As each variety became ready for use, the date was recorded and the yields of green pods from the several pickings entered. Owing to the wet weather during July, the length of vines this year is greater than usual. In the following table the average results for the four years 1900-1903 are given.

PEASE—TEST OF VARIETIES.

| Name of Variety. | Ready for use, 1903. | Average Date, ready for use, 1900-1903. | Number of pickings, 1903. | Green Pods, 100 feet, 1903. | Average Yield of Green Pods, 100 feet, 1900-1903. | Average length of vine, 1903. | Quality. |
|---|---|---|---|---|---|---|---|
| | | | | Quarts. | Quarts. | in. | |
| Early— | | | | | | | |
| Exonian | July 3 | July 5 | 3 | 24 | 34¾ | 24 | Good. |
| American Wonder | " 5 | " 6 | 3 | 28 | 32¾ | 31 | Very good. |
| Child's Morning Star | " 2 | " 3 | 3 | 24 | 32 | 41 | " |
| Gregory's Surprise | " 2 | " 2 | 4 | 30 | 31¼ | 40 | " |
| Nott's Excelsior | " 5 | " 6 | 3 | 26 | 28½ | 24 | " |
| Thos. Laxton | " 5 | .......... | 3 | 32 | ........ | 40 | Good |
| Second Early— | | | | | | | |
| Excelsior (2 years) | " 8 | July 8 | 3 | 44 | 48 | 23 | Very good. |
| Nott's New Perfection | " 13 | " 11 | 3 | 52 | 45½ | 54 | " |
| Chelsea | " 6 | " 7 | 2 | 40 | 41¾ | 30 | " |
| English Wonder | " 8 | " 10 | 4 | 36 | 40¼ | 30 | Good. |
| Gradus | " 5 | " 7 | 3 | 28 | 39½ | 39 | Very good. |
| Premium Gem | " 8 | " 8 | 3 | 40 | 37½ | 41 | " |
| Medium— | | | | | | | |
| Burpee's Quantity | " 13 | " 14 | 2 | 40 | 48¾ | 43 | Good. |
| McLean's Little Gem | " 13 | " 14 | 3 | 40 | 48 | 24 | Very good. |
| McLean's Advancer | " 13 | " 14 | 3 | 40 | 46½ | 46 | " |
| Medium Late— | | | | | | | |
| Boston Wrinkled | " 18 | " 19 | 3 | 66 | 61¾ | 66 | Good. |
| Telephone (2 years) | " 18 | " 18 | 2 | 32 | 59 | 81 | Very good. |
| Heroine (3 years) | " 20 | " 20 | 2 | 44 | 43⅓ | 48 | " |
| Market Master | " 18 | .......... | 3 | 48 | ........ | 40 | Good. |
| Late— | | | | | | | |
| McLean's Prolific | " 18 | July 21 | 2 | 42⅔ | 61 | 42 | Good. |
| Champion of England | " 20 | " 21 | 3 | 46 | 59¾ | 74 | Very good. |
| Juno | " 20 | " 22 | 3 | 48 | 40 | 40 | Good. |
| Stratagem | " 20 | " 21 | 2 | 45⅕ | 38⅓ | 40 | Very good. |

## EXPERIMENTS IN GROWING VEGETABLES IN A CHEESECLOTH INCLOSURE.

During the last three or four years a number of experiments have been tried in the United States in shading different kinds of crops. One of the most practical experiments, and one which gave the most satisfactory results from a monetary standpoint for a time was that conducted at the Connecticut Experiment Station, in shading Sumatra tobacco with cheesecloth, the extra cost in growing being much more than offset by the improved quality of the tobacco and the prices obtained for it. So much was this experiment appreciated that in 1902 there were a large number of acres of tobacco grown under shade in Connecticut.

No experiments had been conducted in Canada as far as the writer is aware in shading crops with cheesecloth until 1902, when an interesting test was made with vegetables by Dr. Graham Bell, at his Canadian home at Baddeck, Cape Breton, N.S. In these experiments it was found that the temperature was higher inside the inclosure, that lettuce and beans were tenderer, and that tomatoes ripened earlier, although the crop was not as large as outside.

At the Central Eperimental Farm two small inclosures were made this year. In one which was 24 x 17 feet in area, different kinds of vegetables were grown, and in the other, which was 62 x 14 feet, the Sumatra, Pennsylvania Seed Leaf, and Connecticut Seed Leaf varieties of tobacco were tested. These inclosures were completely covered on top and sides, and ends, with cheesecloth. Owing to the very cool, wet summer, which was unfavourable to a test of this kind, especially with tobacco, the results in most respects were by no means conclusive. The experiment with tobacco may be dismissed with the mere statement that the plants grew better inside the inclosure and the leaves were nearly all perfect, while outside they were broken by the wind and injured by the soil. The texture of the leaf was lighter inside than outside.

In the other inclosure a number of kinds of vegetables were tested, the same varieties being grown just outside for comparison. As was already stated, the season was too wet and cool to get conclusive results, but the following notes are interesting and may be suggestive:—

All the vegetables inside grew better at first than those outside, and some continued to grow better until the end of the season.

Beets, sown June 10:—The tops were about as good inside as outside, but when they were pulled it was found that the crops of roots outside weighed 22½ lbs., while that inside was only 9 lbs.

Lettuce, sown June 10:—The plants grew almost equally as well inside as outside the inclosure. Outside they were from two to four days earlier than inside.

Radish, sown June 10:—Radish was ready for use inside fully three days before those outside. The radishes inside were perfectly free from maggots, while those outside were practically worthless. Those inside grew to be a large size before losing their crispness.

Beans, sown June 10:—The beans were ready for use three days earlier inside than outside, and the plants were about as vigorous. There were 11 quarts of green beans inside, as against 14 quarts outside.

Egg Plants, Water Melons, and Musk Melons, planted June 10:—These were all failures as regards crop, both inside and outside, owing to the wet and cool summer, but all plants grew well in both places. Hand pollination would be necessary to insure a crop even in a favourable season, as few or no insects could get into the inclosure.

Cauliflower, planted June 10:—The root maggot attacked those outside badly, while those inside, though injured some in the cold frame before transplanting, were not affected inside the inclosure.

Cucumbers, planted June 10:—Although the plants grew well, no cucumbers set inside until autumn, at which time a few rents in the cloth permitted insects to enter. There was only a small crop outside owing to the unfavourable season.

Tomatoes, planted June 10.—The plants grew well inside, but were never as robust as those outside. The first tomotoes ripened inside on July 15, and outside on July 21, six days later. The crop of ripe fruit was 55 lbs. 2 ounces outside, and only 15 lbs. 8 ounces inside, but there was twice as much ripe fruit before the middle of August inside as out.

Corn, planted June 10.—This grew more rapidly inside than out at first, but later on was not as robust.

The rain came through the inclosure as a mist, and hence the soil was not compacted the way it was outside. Light frosts which injured vegetables outside did not injure those inside.

While the vegetables were growing, daily records, with the exception of Sundays, were kept of the temperature inside and outside the inclosure. From June 12 until July 1, the readings were made at 7 a.m. and 1 p.m., and after that date until October 26, the temperature was taken at 4 p.m. as well. The temperatures taken at 7 a.m. in June and July are not considered in the average, as the position of the thermometer in the inclosure was found afterwards to favour it somewhat at that reading. The thermometer was changed on August 1. The average temperatures during the summer months up to September 1 were:—

| | | Number of Readings. |
|---|---|---|
| Outside, 7 a.m. | 58·4 | 26 |
| Inside, 7 a.m. | 58·3 | 26 |
| Outside, 1 p.m. | 72·8 | 63 |

| | | Number of Readings. |
|---|---|---|
| Inside, 1 p.m. | 76·23 | 68 |
| Outside, 4 p.m. | 74·7 | 52 |
| Inside, 4 p.m. | 76·9 | 52 |

The average temperature for September and October was:—

| | | |
|---|---|---|
| Outside, 7 a.m. | 47·85 | 45 |
| Inside, 7 a.m. | 47·3 | 45 |
| Outside, 1 p.m. | 64·25 | 45 |
| Inside, 1 p.m. | 66·65 | 45 |
| Outside, 4 p.m. | 63· | 44 |
| Inside, 4 p.m. | 64·7 | 44 |

As will be seen from the above the temperatures averaged a little higher inside than out. The greatest difference was 9 degrees.

Following is the description and cost of the inclosure for tobacco. The inclosure for vegetables was partly made of rough material, trees grown on the farm being used for posts, hence a fair estimate cannot be given of the cost, but the tobacco inclosure was all made of bought material.

The inclosure was 62 feet long by 16 feet wide, by 6 feet 6 inches high. These measurements being used to suit the width of the cheesecloth, the strips of which were 40 inches wide. Scantlings 2 by 4 inches were sunk 18 inches in the ground and about 8 feet apart, and when set were 6 feet 6 inches above the ground. Scantlings 2 by 4 inches were then nailed along the tops of these and across at every upright scantling for an upper framework, while along the base 6-inch boards were nailed for the same purpose. Braces of 2 by 4-inch scantling were used at the corner posts inside to strengthen the framework. A doorway was left in one corner. The cheesecloth was fastened to the frame by laths through which nails were driven. A wire was stretched across the top of the inclosure to prevent the cheesecloth from flapping and tearing.

Although there were several very severe wind storms and heavy rain storms during the summer, during wfhich many trees were blown down, this inclosure stood well.

Cost of making cheesecloth inclosure 62 feet long by 16 feet wide, by 6 feet 6 inches high.

| | |
|---|---|
| To 333⅓ feet 2 by 4 scantling at $15 thousand | $5 00 |
| 75 feet lumber at $20 thousand | 1 50 |
| 150 laths at $2.50 thousand | 37½ |
| 169 yards cheesecloth at 5 cents per yard | 8 45 |
| Stitching 169 yards cheesecloth at 1½ cents | 2 53½ |
| 5 lbs. nails at 3 cents | 15 |
| 10 lbs. wire at 5 cents | 50 |
| Labour in making inclosure, 41 hours at 13½ cents | 5 47 |
| Total | $23 98 |
| Estimated value of materials on hand | 15 99 |
| Total expenses for 1903 | 7 99 |

It will be seen that the inclosure was quite expensive, but as the framework will probably last for five years or more, the yearly expense is lessened considerably. The cheesecloth used in the vegetable inclosure cost 4½ cents a yard, but was somewhat torn by the end of the season, and it is doubtful if it will be of much value next year. The other was stronger and was in good condition in the autumn, and will probably last through another season.

The cheesecloth inclosure may be of value in cities and towns where it is difficult to have a garden owing to the injury done by cats, dogs, and even by young children. Vegetables will probably be tenderer as a rule grown inside an inclosure, though this was not the case this season owing to the wet weather. It may be useful to market gardeners for growing vegetables which are affected by root maggots.

## FOREST BELTS

The trees in the forest belts are doing well on the whole and are becoming a prominent feature here. Annual measurements are taken of the season's growth, in height and diameter, of average trees of the most important species, and useful information is thus being obtained. Tables showing the growth have been published in the report from time to time, the last one being published in 1901. The trees in the plantation of European White Birch nearly all died this year and were removed. This birch evidently is not going to be long lived here, especially in the forest belts, where it is crowded. Some additional close planting was done in the belts this autumn where other trees had died, and vacancies were filled in the younger plantations of close planted trees and shrubs. These close planted trees and shrubs, which are set 2½ by 2½ feet apart, are not cultivated after the second year, as the trees and shrubs which are used for undergrowth shade the ground and prevent the growth of weeds to a large extent. One of the best schrubs tested for undergrowth is the Nine-bark (*Neillia opulifolia*) which grows well even in sod, and as it has heavy foliage, it shades the ground well.

## ARBORETUM AND BOTANIC GARDEN.

The fine collection of trees, shrubs, and herbaceous perennials which has been brought together in the Arboretum and Botanic garden is increasing in attractiveness year by year and is being more used for reference by teachers and students in their work. Practically all the specimens are now neatly labelled with zinc labels and the trees and shrubs are labelled in duplicate, in order that they may be readily identified if one label should be destroyed. This year 654 trees and shrubs comprising 534 species and varieties were added to the collection, making the total number of specimens alive 4,942 up to the autumn of 1903, comprising about 3,000 species and varieties. There were also added 155 species and varieties to the Herbaceous Perennials, making the total number of species and varieties 1,700 living in the autumn of 1903.

Notes were taken during the year on the hardiness, growth and time of blooming of the trees and shrubs, and the time of blooming, length of blooming season, descriptions of the flowers, growth and height of plants of the herbaceous perennials.

During the past six years useful lists of plants have been published in the annual reports. In 1897 descriptive lists were published of *One Hundred of the Most Ornamental Hardy Trees and Shrubs,* and also of *One Hundred of the Best Herbaceous Perennials.* In 1898 an *Additional List of Good Perennials* was given. In 1899 a list was published of *Some Good Low Growing Flowering Shrubs*, and also *an Additional list of Good Perennials.* In 1900 there was given a *List of the Best Hardy Woody and Annual Climbers.* In 1901, *A List of the Best Lilacs,* and in 1902, *A List of Best Spring Flowering Perennials.* In 1899 there was also published a *Catalogue of the Trees and shrubs* which had been tested up to that date, with notes regarding their hardiness.

These lists have been of great service to Canadians, helping them to choose the best plants.

No list has yet been published of hardy trees and shrubs which have especially attractive foliage, bark and fruit, and as it is important to know which are best in this respect a list is herewith given of some of the most attractive of those tested in the Arboretum.

## DECIDUOUS TREES, SHRUBS AND CLIMBERS WITH ATTRACTIVE FOLIAGE, BARK OR FRUIT.

Acer (Maple).—It is scarcely necessary to tell Canadians of the beauty of the autumn colouring of our maples, but although we see this beauty as we wander through the woods or along the streets one often fails to plant these fine trees near the home. During the latter part of summer odd trees of the Red Maple *(Acer rubrum)* stand out among their duller surroundings clothed in scarlet and crimson, and a little later on this tree fairly makes the woods on fire with its bright coloured foliage. Still a little later, the leaves of the Hard Maple *(Acer saccharinum)* take on their varied and attractive shades of red, green and yellow, and although the colours are not as bright as on the Red Maple they are often richer. The Silver Maple *(Acer dasycarpum)* is also very attractive, the green, yellow and bronze shades predominating. The most attractive maple not native to Canada is the Ginnalian Maple *(Acer tataricum Ginnala)*. This little tree is ablaze with colour every year, no matter what the season is like, and rivals the Red Maple for brightness; scarlet, yellow, and cirmson, being the predominating colours. In the spring the Schwedler's Maple *(Acer platanoides Schwedleri)* is a very attractive tree, the young leaves being of a dark purplish crimson and contrasting well with the surrounding foliage of other trees. This tree soon loses its spring colouring, however, and the leaves become dull green. Reitenbach's Maple *(Acer platanoides, Reitenbachi)* another purple-leaved variety, while not as attractive in spring as Schwedler's Maple, retains its colour better throughout the summer.

Berberis (Barberry).—The barberries are very useful for autumn effect, as their foliage and fruit are both attractive. Among the best of these are: Thunberg's Barberry *(Berberis, Thunbergii)*, which grows about four feet high. It is a compact shrub with bright green foliage in summer which changes to deep red in autumn. The scarlet fruit is very abundant and makes this barberry quite ornamental throughout the winter. Another species *(Berberis sinensis)* is also very attractive both in foliage and fruit, and the Common Barberry *(Berberis vulgaris)* is also good. The purple-leaved variety of the latter species is one of the best purple-leaved shrubs and is very attractive. The Oregon Grape or Holly-leaved Barberry is a very desirable low-growing shrub with thick glossy, holly-like foliage, which becomes bronzy purple in the autumn.

Betula (Birch).—The yellow foliage of most of the Birches contrasts strongly with other trees in autumn, but the most attractive of all is the Cut-leaved Birch *(Betula alba laciniata pendula)*, the finely cut leaves and graceful form of which make it one of the most attractive trees. There is a purple-leaved variety of the White Birch, but the purple is rather dull and the tree not especially desirable.

*Caragana arborescens* (Siberian Pea Tree). This shrub has many points of merit and its bright, green compound leaves and fruiting pods give it a place in such a list as this.

Catalpa.—The Catalpas have such large foliage, suggestive of a sub-tropic climate, that it renders them especially attractive in the colder parts of the country, where they give a warmer tone to the landscape. The Japanese Catalpa *(Catalpa Kaempferi)* is the hardiest species, but the Hardy Catalpa *(Catalpa cordifolia,* Jaune) though not as hardy, is more attractive and more desirable for the warmer parts of Ontario.

Celastrus (Shrubby Bitter-sweet).—There are two species of Shrubby Bitter-sweet, which are especially desirable for their attractive fruit. The first is the native Climbing Bitter-sweet *(Celastrus scandens)*. This is a very satisfactory hardy climber. The leaves are bright green and free from insects, and in the autumn and throughout the winter the scarlet and orange berries, which are produced in great abundance, make the vine very attractive. The outside of the berries is orange, but when they are cracked open by frost the scarlet inside is shown. The Japanese species *(Celastrus articulatus)* is just as attractive as the native one, and perhaps more so. The berries are smaller, but more abundant, and there is a greater contrast between the outside and inside, the outside being yellow and the inside orange. These vines may be kept quite shrub-like by cutting them back.

Cornus (Dogwood).—The hardy Dogwoods are most attractive in winter when the colour of the bark is much intensified. The best variety is *Cornus alba sibirica,* the bark of which is bright red in winter and in striking contrast with the snow, and other surrounding objects. There is a yellow barked variety of *Cornus stolonifera,* which could be used with good effect in contrast with the red-barked varieties. In foliage the most attractive hardy kind is *Cornus alba sibirica elegantissima* of the nursery catalogues, the leaves of which are delicately variegated with white, silver and green making this one of the best of variegated shrubs.

Cotoneaster.—There are several hardy ornamental species of Cotoneasters. The species with the most attractive foliage is *C. acutifolia,* the dark, glossy green leaves of which make this shrub quite attractive. Among red fruited species, *C. nummularia, C. tomentosa, and C. integerrima (vulgaris)* are the most desirable.

Crataegus (Hawthorn).—Some of the Hawthorns are attractive in flower, leaf and fruit; among these, two of the best are: *Crataegus coccinea* and *C. Crusgalli.* Both of these species have glossy foliage and bright red fruit, but the latter is, perhaps, preferable, as it does not sucker like the former, which may become troublesome.

Elæagnus (Olive).—The Russian Olive (*(Elæagnus angustifolia)* is one of the best trees with silvery foliage, and is a very handsome species. The Wolf Willow *(E. argentea)* has a finer silvery foliage than the last, but as this species suckers badly it should be planted with caution.

Euonymus (Spindle Tree).—The different species of Euonymus do not, as a rule, make graceful or attractive shrubs at any time except autumn. At that season of the year, however, they are quite noticeable on account of their scarlet and red fruit, which is in some species very bright. The most attractive in fruit are *Euonymus europaeus,* and *E. americanus,* but for brilliant coloured foliage *E. atropurpureus* and *E. alatus* are excellent, and the fruit of these is also attractive.

Fagus (Beech).—The purple-leaved Beech *(Fagus sylvatica purpurea)* is one of the handsomest of trees where it is hardy, but unfortunately it kills back to the snow line at Ottawa. The foliage is rich, bronzy purple and very attractive.

*Hippophae rhamnoides* (Sea Buckthorn).—This is a hardy shrub with fairly attractive narrow leaves, which bears an abundant crop of small bright orange fruit. It suckers badly and should be planted with discretion.

Ilex (Holly).—None of the hollies are satisfactory at Ottawa, with the exception of the Black Alder *(Ilex verticillata).* This shrub is not attractive during the summer, but in the autumn the scarlet holly-like fruit is very showy. There is a yellow fruited variety of this which is also good.

Lonicera (Honeysuckle).—Many of the Honeysuckles are attractive, both in flower and fruit, but the best showy species when in fruit is *Lonicera tatarica,* and the many varieties of it. The fruit of this species varies in colour from yellow to bright red and shows up well in contrast with the foliage. Of the hardy climbing species the most attractive in foliage and fruit are those with glacous foliage, such as *L. glauca, L. Sullivantii,* and *L. flava.*

Lycium (Matrimony Vine).—The Matrimony Vine is very useful for training over rocks, stumps and other places. The foliage is not especially attractive, but the numerous bright scarlet berries in autumn are very showy.

Neillia (Ninebark).—The ordinary Ninebark *(Neillia opulifolia)* is not a very attractive shrub, although the seed pods are rather showy, but the golden leaved variety, *Neillia opulifolia aurea,* is a very striking object, and where a strong-growing, golden-leaved shrub is desired it is one of the best.

Pachysandra terminalis.—This is a dwarf, hardy shrub with attractive evergreen foliage, and succeeds well in shady places.

Populus (Poplar).—The poplars have nearly all more or less attractive foliage, but probably the most attractive is the silver or white poplar, *Populus alba,* the leaves of which are silvery above and white below. The poplar multiplies rapidly by means of suckers, and as the falling seeds are disagreeable only trees with male flowers should be planted. A pyramidal variety, *Populus alba pyramidalis,* is a striking tree. The golden-leaved poplar, *Populus deltoidea aurea* (Van Geerti), is a good golden-leaved variety, but is much subject to galls. A weeping variety, *Populus grandidentata pendula,* is a very graceful tree with good foliage, and is especially handsome in flower.

*Prunus* (Plum).—The native plums of Canada and the United States are very attractive in flower, and fruit and if varieties are chosen which have particularly attractive fruit, they may be used very advantageously.

*Petelea trifoliata aurea* (Golden Leafed Wafer Ash).—This is one of the finest hardy golden-leaved shrubs. There is a richness of colour in this variety which is not excelled.

Pyrus (Mountain Ash).—The mountain ashes are attractive both in flower and fruit, but are especially noticeable in autumn and winter when the bright coloured fruit hangs thickly on the trees. The European Mountain Ash or Rowan Tree, *Pyrus Aucuparia,* is perhaps the best, although the American Mountain Ash, *Pyrus americana,* is good.

Pyrus (Crab Apple, Apple).—The crab apples and apples make very showy trees, both in flower and fruit. One of the most useful crab apples is the wild Siberian crab, *Pyrus baccata.* As this does not grow large it can be planted where other trees would be too large.

Quercus (Oak).—The oaks keep up the show of colour in the autumn after most of the other trees have lost their leaves. The two most desirable hardy species are the Red Oak, *Quercus rubra,* and the black oak, *Quercus velutina,* both of these species colour up well in autumn and the leaves remain bright until severe frosts. The Scarlet Oak, *Quercus coccinea,* though not quite as hardy, colours well also.

Rhus (Sumach).—Sumachs are among the most showy autumn tinted shrubs and trees, and are very effective when grown wild in large masses. The common native species, the Staghorn Sumach, *Rhus typhina,* is one of the best and its compound leaves tinted with red are very striking. The Smooth Sumach, *Rhus glabra,* and the graceful cut-leaved variety of it are also fine. The foliage of the low growing fragrant sumach, *Rhus aromatica,* always colours well and there is a richness of tints in it not found in the others. The Smoke Tree, *Rhus Cotinus,* is a very striking shrub. The pedicels in the loose flowering panicles become covered with soft hairs which give a smoke-like effect to the whole plant. The leaves also colour well and are attractive both in summer and autumn.

Ribes alpinum (Mountain Currant).—This is quite a showy species with bright red fruit and deep green glossy leaves.

Rosa (rose).—The wild roses are nearly all effective when in bloom, and some have attractive foliage and fruit. One of the best wild roses in foliage and fruit is *Rosa lucida.* This species has glossy leaves which contrast well with the red fruit. The Japanese Rose, *Rosa rugosa,* has very ornamental foliage and fruit, the leaves being rich green and glossy and the fruit of large size and very striking. Another good species is *Rosa pomifera,* which has exceptionally large fruit and silvery or glaucous leaves. The Purple-leaved Rose, *Rosa ferruginea (rubrifolia),* is one of the best purple-leaved shrubs. The leaves are deep reddish purple, and when the shrub is in bloom the contrast between the leaves and delicate pink flowers is very good.

Salix (Willow).—There are quite a number of willows which have ornamental leaves and bark and in the winter those with attractive bark are especially noticeable, and brighten up the landscape very much. The Laurel-leaved Willow, *Salix pentandra* (laurifolia), is a very ornamental tree, the leaves being deep green and very glossy. The rosemary-leaved willow, *Salix rosmarinifolia,* has narrow, rosemary-like leaves, and where a shrubby willow is desired it is one of the best. The best willows with attractive bark are: *Salix alba britzensis,* with red bark, and *S. alba vitellina flava* or *S. Voronesh* with yellow bark. These varieties are in striking contrast and stand out well in a winter landscape.

*Sambucus* (Elder).—Some of the elders are quite desirable. One of the best golden-leaved shrubs is *Sambucus nigra foliis aureis,* and although this kills back at Ottawa, it makes such rapid growth that it soon makes a show again. The Scarlet-berried Elder, *Sambucus racemosa,* and its variety *pubescens* may be used with good effect.

Spiræa.—There are a few hardy spiræas with good foliage, among these being *Spiræa Van Houttei,* also one of the best when in bloom ; *Spiræa arguta,* also one of the best when in bloom ; *Spiræa Thunbergii,* not quite hardy at Ottawa, and *Spiræa sorbifolia.*

Symphoricarpus (Snowberry).—The Snowberry, *Symphoricarpus racemosus,* is well known, the pure white berries in autumn being a familiar sight in most parts of Canada. The Coral Berry, *Symphoricarpus orbiculatus* (vulgaris), which has red fruit, is also effective, especially when in contrast with the other.

*Tamarix amurensis.*—This tamarisk is the hardiest of all those tested in the arboretum, and although it kills back some.it makes strong growth during the summer. It is an elegant shrub with small foliage and tender branchlets.

Viburnum (Arrow-wood).—The viburnums are nearly all attractive shrubs in flower and foliage, and some species have very ornamental fruit. The Guelder Rose or High-bush Cranberry, *Viburnum Opulus,* is probably the most satisfactory. It is beautiful when in bloom, the foliage is effective, and the scarlet fruit which hangs on nearly or quite all winter makes it very desirable. Next will come the Wayfaring Tree, *Viburnum Lantana.* This also has ornamental flowers, foliage and fruit. Unlike the Guelder Rose, however, the fruit does not hang long. When ripening, the fruit is at first scarlet and becomes black when fully ripe. Two other species with very attractive foliage are: *Viburnum prunifolium* and *Viburnum dentatum,* both native species.

Vitis (Virginia Creeper).—The Virginia Creeper, *Vitis quinquefolia (Ampelopsis quinquefolia),* is well known, but must appear in a list of this kind. The leaves, while quite attractive in summer, become highly coloured at the first approach of autumn and for some time this vine is very effective. The self-fastening variety colours as well and has the advantage of clinging unaided to the wall on which it is trained.

# REPORT OF THE CHEMIST

(FRANK T. SHUTT, M.A., F.I.C., F.S.C., F.R.S.C.)

OTTAWA, December 1, 1903.

DR. WM. SAUNDERS,
Director, Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith the seventeenth annual report of the Chemical Division of the Experimental Farms.

It will be found to include, I believe, much of interest and value to Canadian farmers—to those engaged in general or mixed farming, as well as to those devoting their attention to some special branch of agriculture, such as fruit growing, dairying, &c. The work of this Division is, necessarily, of a varied character and covers a wide field, but we may safely say that all investigations undertaken are directly prosecuted with a view of obtaining information that may be of immediate and practical benefit to one or other of the numerous divisions or departments of Canadian agriculture.

Before the brief enumeration which it is customary to make of the matter treated of in the report, it may be well to state that very much of the work that has engaged the attention of the staff of this Division during the past year will not here find a place. Thus, during three months of the past season, an investigation was carried on to ascertain the effect of certain factors or conditions of manufacture upon the composition of butter, and more especially upon its water content. In all, some 150 butters, made by an expert under known conditions of temperature, &c., have been carefully analysed. The results of this investigation are now tabulated and we trust they will furnish information of a useful character regarding the extent to which the composition of butter may be effected by the churning temperature, size of granules, temperature of wash water, &c. It is proposed to publish this work very shortly in bulletin form.

Further inquiry has been made in the matter of the effect of food on the quality of pork. In this, the fat of about 50 pigs on various rations has been analysed, but as the investigation is as yet unfinished, the results are, for the present, held over.

The following summary gives in outline the nature of the various investigations presented in this report:—

*Chemistry of Horticulture.*—The problem of *soil moisture conservation in orchards*, first investigated by this Division in 1901, has again received attention, and data have been obtained that emphasize the practical value of cultivation and the preservation of an earth mulch to retard surface evaporation. The great draft upon the soil's moisture by sod is also very clearly brought out by this season's experiments.

Continuing the inquiry as to the value of certain legumes as orchard 'cover' crops, the relative merits of the *Hairy Vetch*, the *Soja Bean* and the *Horse Bean* have been determined. Our data denote the extent to which the soil may be enriched and improved by these crops, and, further, afford evidence of a most satisfactory character regarding the Hairy Vetch—the latest among the legumes to be introduced for this purpose.

The composition of certain insecticides recently put upon the market has been ascertained. These include Kno-bug, Bug Finish, and 'Owens' Compound for the Protection of Trees.'

*Fodders and Feeding Stuffs.*—A considerable number of feeding stuffs, including various milling and other by-products, has been analysed and their relative nutritive value determined.

Interesting data as to the nutritive properties of the hull, kernel, and whole grain, respectively, of the oat are presented.

Molassine Meal and Improved Molasses Cattle Food are two feeding stuffs upon the Canadian market now reported upon. The latter is a product of the Dresden Sugar Co., Limited, Dresden, Ont., and is prepared from the exhausted pulp and molasses.

The principal field roots have again been examined and a table prepared showing the results that have been obtained in this research since 1900. The high feeding value of the 'Sugar' mangels has again been demonstrated.

*Sugar Beets.*—The sugar content of several of the principal varieties of factory beets, as determined from roots grown on the experimental farms at Ottawa, Nappan, Brandon, Indian Head, and Agassiz, has been ascertained. Results are also given of beets from the Knight Sugar Company at Raymond, South Alberta; of beets from the vicinity of Strathcona, Northern Alberta, and also of beets grown on the Provincial Farm, near Charlottetown, P.E.I.

*Wheats.*—A careful and thorough enquiry from the chemical standpoint has been made respecting the relative merits of the following wheats: Red Fife, Percy, Preston, Stanley, and Early Riga. The information obtained will prove especially interesting to those engaged in wheat growing in Manitoba and the North-west Territories. The results of this investigation will be found as a special report in the article on Wheat, in the current report of the Director of the Experimental Farms.

*Swamp Muck.*—A short article has been written on swamp muck, its nature and treatment. The use of muck as an absorbent in and about the farm buildings and the preparation of muck composts of various kinds have been concisely described, in order to furnish in printed form the information on these subjects so constantly requested.

*Chemistry of Bee-keeping.*—The experiments towards ascertaining the best conditions under which honey should be stored have been continued. The desirability of a warm, dry atmosphere for the storage of both comb and extracted honey is clearly brought out by this research.

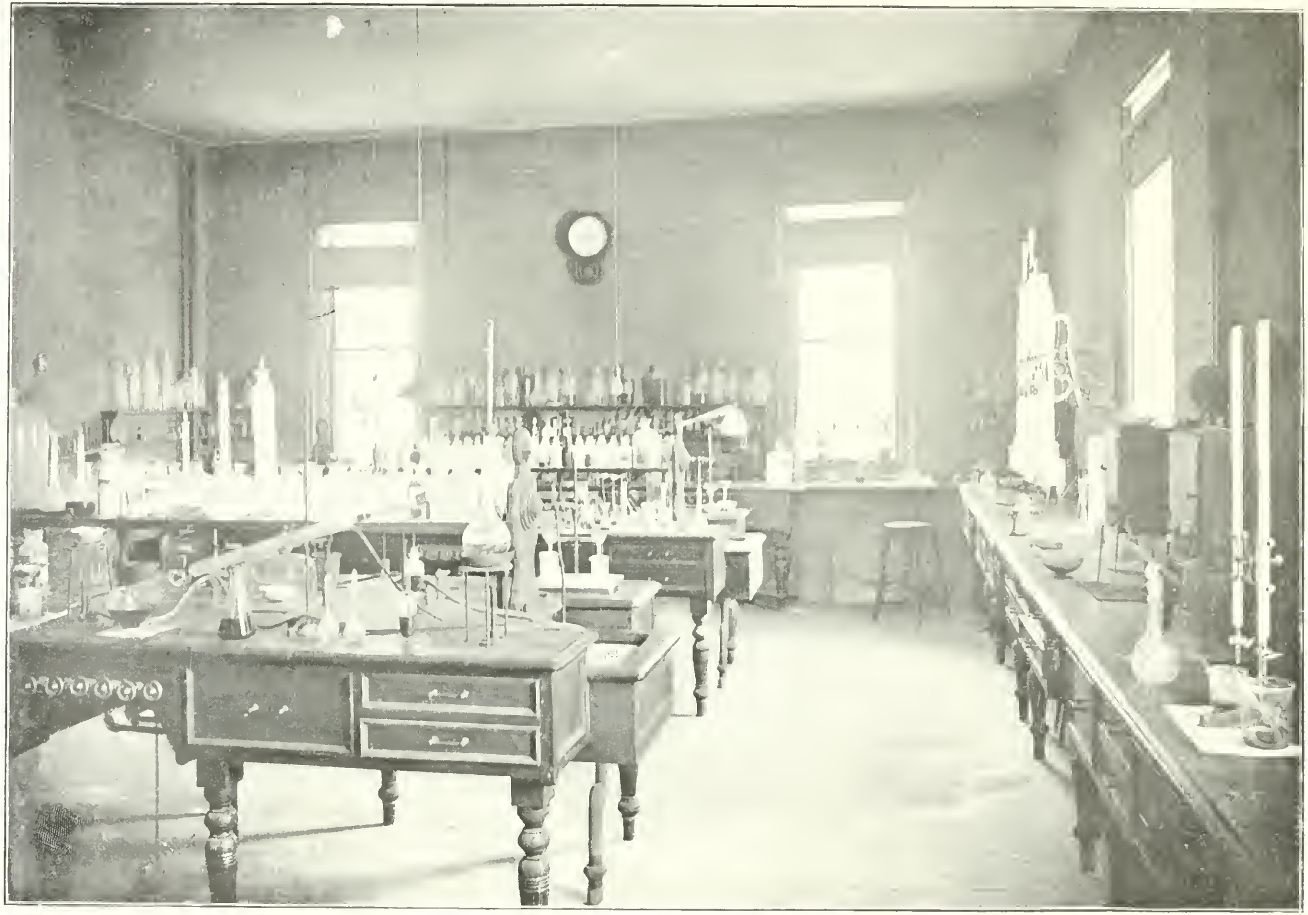
We have, after a lapse of 13 years, again found adulterated beeswax. The presence of 25 per cent to 35 per cent of paraffin of a high melting point was noted in certain samples submitted to analysis this past summer. This adulterated wax had been purchased in the United States by a large 'bee supply' firm in Canada, and was immediately returned on the receipt of our report to the effect that the wax was not genuine.

*Well waters.*—The analyses of 55 samples of well waters from farm homesteads in various parts of the Dominion are given, and a brief report added as to the quality and wholesomeness of the waters.

*Experiments in Chicken fattening.*—Further results in the fattening of chickens have been obtained and are presented in the report of the poultry manager. The experiments included a further trial, in duplicate, of feeding in pens with yards attached as against feeding in crates, and also a trial in duplicate of feeding an 'all grain' ration as against a 'grain and meat' ration.

*Correspondence.*—The letters received by this division from November 30, 1902, to December 1, 1903, in addition to those referred to us by the other departments of the farm, numbered 1,234; those sent out, 1,163.

*Samples received for analysis.*—In the appended tabular scheme the samples received for examination during the past year have been enumerated and classified. The number exceeds that of the year previous by 101. Reference to the report of this Division will show the yearly increase in the number of samples forwarded to farmers, which may be taken as an excellent sign of the growing appreciation of the information to be obtained through chemistry on matters relating to practical farming. In order, however, to cope with these requests and at the same time carry on the special



(Photo. by F. T. Shutt.)

Chemical Laboratory, Central Experimental Farm, Ottawa.

investigations which constitute the chief work of the Division, it is evident that very shortly further laboratory assistance will be necessary.

SAMPLES Received for Examination and Report, November 30, 1902, to December 1, 1903.

| Samples. | British Columbia. | Northwest Territories. | Manitoba. | Ontario. | Quebec. | New Brunswick. | Nova Scotia. | Prince Edward Island. | Total. | Number still awaiting examination. |
|---|---|---|---|---|---|---|---|---|---|---|
| Soils | 3 | 3 | 2 | 10 | 7 | 2 | 9 | .... | 36 | 13 |
| Mucks, muds and marls | .... | 3 | .... | 4 | 4 | 3 | 8 | 8 | 30 | 7 |
| Manures and fertilizers | .... | .... | .. | 4 | 1 | 3 | 10 | 5 | 23 | 1 |
| Forage plants and fodders | 2 | .... | 5 | 13 | 9 | 4 | 3 | .... | 36 | 16 |
| Well waters | 1 | 16 | 11 | 43 | 3 | 6 | 3 | 2 | 85 | |
| Sugar beets | 8 | 13 | 6 | 13 | .... | ... | 8 | 7 | 55 | |
| Miscellaneous, including dairy products, fungicides and insecticides | 4 | 9 | 4 | 365 | 37 | 6 | 6 | 3 | 434 | 15 |
| Total | 18 | 44 | 28 | 452 | 61 | 24 | 47 | 25 | 699 | 52 |

*Acknowledgments.*—Once again I would with much pleasure express my thanks to Mr. A. T. Charron, M.A., assistant chemist, and Mr. H. W. Charlton, B.A.Sc., second assistant chemist, for their valuable help and co-operation. The larger part of the analytical work of the various researches has necessarily been performed by them, and this work has, as I can bear testimony, been done skilfully and carefully.

I would gratefully acknowledge my indebtedness to Mr. J. F. Watson, who has continued to discharge faithfully and well his duties in connection with the clerical work of the division.

I have the honour to be, sir,

Your obedient servant,

FRANK T. SHUTT,

*Chemist, Dominion Experimental Farms.*

## THE CONSERVATION OF MOISTURE IN ORCHARD SOILS.*

In further investigating the factors that affect the soil's moisture-content, we have this year obtained comparative data during the early months of the season, from plots in the Central Experimental Farm orchard (1) under cultivation during past and present season, (2) in sod during past and present season, and (3) in sod 1902, but ploughed early in the present season, according to the following plan:—

Plot A.—This plot was cultivated during the summer of 1902, as well as throughout the present season. The cultivations during the period of examination this year were made on May 12 and June 1.

(*N.B.*—This is Plot I of the second series, 1902, the moisture-content of which is recorded in the report of the Chemical Division for that year, page 138-9.)

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* The results of our previous work upon this question, with reference particularly to the relation of tillage, sod and cover crops to soil moisture-content, are to be found in the Report of the Chemical Division, Experimental Farms, 1901 and 1902.

Plot B.—This plot adjoins A and was under sod, 3 years old, throughout the season.

(*N.B.*—This is Plot 2 of the second series, 1902.)

Plot C adjoins B. In sod 1902. Sod ploughed under April 13, 1903; disc harrowed May 29, and cultivated June 3.

The very severe and exceptional drought that prevailed in the Ottawa district during the spring and early summer months of this year, afforded an excellent opportunity for prosecuting our research in this matter of the conservation of soil moisture. That the rainfall for the spring months of 1903 was very much below the average will be seen from the following summary :

TOTAL PRECIPITATION IN INCHES.

| — | 1898. | 1899. | 1900. | 1901. | 1902. | 1903. |
|---|---|---|---|---|---|---|
| March | 3·20 | 4·96 | 6·15 | 4·04 | 3·62 | 1·96 |
| April | 4·90 | 1·65 | 5·55 | 2·36 | 2·92 | 1·15 |
| May | 2·90 | 2·62 | 3·04 | 4·97 | 1·62 | 0·24 |
| June 1st to 5th | .......... | 0·24 | 1·81 | 0·96 | 0.99 | none. |
| Total | 11·00 | 9·47 | 16·55 | 12·33 | 9·15 | 3·35 |

The soil samples upon which the moisture determinations were made were taken, as in previous years, to a depth of 14 inches and consequently the percentages and amounts of water given in the following table are those present in the soils to that depth.

CONSERVATION OF SOIL MOISTURE.

| Date of Collection. | PLOT A. CULTIVATED 1902 AND 1903. | | | PLOT B. IN SOD 1902 AND 1903. | | | PLOT C. IN SOD 1902; CULTIVATED 1903. | | |
|---|---|---|---|---|---|---|---|---|---|
| | Per cent. | Pounds per acre. | | Per cent. | Pounds per acre. | | Per cent. | Pounds per acre. | |
| 1903. | | Tons. | Lbs. | | Tons. | Lbs. | | Tons. | Lbs. |
| May 14th | 12·03 | 261 | 1,218 | 5·32 | 107 | 982 | 11 85 | 257 | 337 |
| " 23rd | 12·65 | 277 | 89 | 4·78 | 96 | 66 | 6·51 | 133 | 431 |
| June 5th | 7·76 | 160 | 1,880 | 3·03 | 59 | 1,552 | 8·91 | 187 | 247 |

*Discussion of Results.*—We cannot fail at first sight to be struck with the marked character of these data, which, as might have been expected from the abnormal dryness of the season, emphasize the value of cultivation and the earth mulch for the retention of the soil's moisture. They certainly present a lesson of the greatest significance and importance to orchardists.

It should be borne in mind that the plots adjoin one another; that the soil throughout the series is of a uniform character (a light sandy loam); and that the moisture-content after the autumn rain of the previous season, as determined in November, 1902, when the winter set in, was practically identical for them all.

*May* 14.—Analysis shows that at this date the amount of moisture in the soil of Plot A (12·03 per cent) was less than it was in the previous November by about 3 per cent. Much of this loss undoubtedly might have been prevented by earlier cultivation, the first harrowing and formation of the earth mulch being only two days before the collection of the sample for analysis, viz., May 12. Nevertheless, the soil was quite damp, both to the touch and in appearance. So far as one could judge it appeared to be amply supplied with moisture for the requirements of the orchard trees.

Plot B, which by that date was covered with a heavy growth of grass, green and luxuriant, contained less than one-half of the moisture in A, viz., 5·32 per cent. This means that somewhat more than 150 tons per acre, to a depth of 14 inches, had been lost from B by remaining in sod, lost by the growth of the grass and the capillary action that had been set up by allowing the soil to remain unstirred. The earth of this plot was already assuming a powdery condition.

Plot C.—The sod had been turned under one month previous to the date of collection, viz., April 13. Its moisture content was somewhat less than that of Plot A, but the difference is comparatively insignificant. The results of this plot give satisfactory evidence of the importance of turning under the previous cover crop at an early date in districts likely to be visited by a spring or early summer drought. By this means it is seen the moisture may in a very large measure be conserved.

*May 23.*—Between May 14 and 23 the rainfall was scarcely more than one-tenth of an inch (·12). This probably was not sufficient at any time to thoroughly dampen the surface of the soil, for the precipitation occurred on four days of the interval and on no one of them exceeded more than a few hundredths of an inch. Practically speaking, it evaporated as soon as it fell, without benefiting the soil.

Plot A.—Now, in spite of this adverse condition, this soil, by reason of its mulch, was able to hold its own ; indeed, its moisture at this date was some half a per cent higher than it was nine days earlier. No doubt there had been loss by evaporation from the soil, but the loss had been more than compensated for by water brought up from the subsoil by capillary action.

Plot B.—On the other hand, this plot continued to lose, and now showed 11½ tons less moisture per acre than at the date of the preceding collection.

Plot C.—The soil of this plot had dried out very considerably, losing almost half its water. This was undoubtedly due to the fact that the turned over sod was not immediately disc-harrowed and an earth mulch formed. The drying atmosphere and winds freely permeated the heavy sod, abstracting its moisture. This points to the necessity of immediately discing and cultivating after the ploughing under a heavy sod, in order that capillary action may bring up water from below, and that a mulch may be formed that will prevent or retard its loss through evaporation. This plot was not disc-harrowed until May 29.

*June 5.*—Between May 23 and June 5 a period of thirteen days, but three-one-hundredths of an inch (·03) of rain fell. During the latter six days of this period there was absolutely no precipitation. Under this condition we find the moisture-content of plots A and B considerably reduced.

Plot A.—This soil now held but 7·76 per cent water. Probably if it had been cultivated again in this period (the previous cultivation had been on May 12) it would have had a higher water content. As it was, the drying out process had affected the soil for more than a foot. It still contained, however, over 160 tons to a depth of 14 inches.

Plot B.—The examination of this soil at this date showed it to be in the condition of powder. It had no adhesiveness and had the appearance of a soil thoroughly dried by exposure to air. Its percentage of moisture had been reduced to 3·03, having lost 48 tons per acre since the date of the first collection three weeks previous. The grass was still alive, but showing very little vitality and no growth. The leaves of the orchard trees growing in the sod had begun to shrivel and fall. It was evident that unless rain came very shortly these trees would succumb. It is important to note that under these extreme climatic conditions the soil of Plot A possessed 100 tons more water per acre in the surface 14 inches than that of Plot B, a very considerable amount.

Plot C at this date contained 8·9 per cent water, an increase of practically 2·5 per cent over that it possessed on May 23. This, in my opinion, was owing to the disc harrowing it received on May 29, followed by cultivation. By these means not only was surface evaporation largely arrested, but capillary action was set up which enabled the surface soil to draw upon the water content of its underlying soil.

The drought this year has taught a very important lesson in orchard soil management. It has emphasized what we gave experimental data for in 1902, viz., the very exhaustive character of sod as regards soil moisture. It has furnished proof of the immense value of cultivation in arresting the drying out of soils, and lastly the necessity not only of early ploughing under the cover crop in districts where drought is likely to prevail, but also the desirability of further working the soil by disc harrow and cultivator in order to again set up capillary action with the underlying soil, as well as to create an earth mulch to prevent surface evaporation.

## ORCHARD COVER CROPS.

### HAIRY VETCH, SOJA BEAN, AND HORSE BEAN.

Without entering into any lengthy discussion as to the various functions of a cover crop and the many chemical and physical benefits it may confer upon an orchard soil, it may suffice for the present purpose to remind our readers briefly of one or two of the more important advantages of such crops in increasing the fertility of the soil.

Apart, then, from the benefit to be derived from the conservation of moisture in the summer, and the winter protection of the roots of the trees, it is sought by this system of orchard treatment to enrich the soil, by the addition of vegetable matter and nitrogen, by the conversion of mineral plant food of the soil into more available forms and by the retention and storing up of the more soluble nitrates produced in the soil during the summer months. Many crops are used or have been suggested for these purposes, but it is only the legumes which possess the ability (through the agency of certain bacteria residing in nodules on their roots) to add nitrogen to the soil—nitrogen taken from that inexhaustible store, the atmosphere. Hence, it is that the legumes are *par excellence* the most valuable of all cover crops.

The value of the clovers—red and mammoth—and of alfalfa, in this connection, has already been demonstrated in several of our reports and bulletins—the first account of which, in the reports of the Chemical Division, is to be found in that for 1896. Our experiments in that year showed that in three months, from the middle of July to the middle of October, large crops could be obtained from alfalfa and the clovers, even when grown on a poor, sandy soil. Further, that these legumes contained in their foliage and roots in the neighbourhood of 100 lbs. of nitrogen per acre, nitrogen which we believe for the most part was obtained from the atmosphere. For the purposes of comparison with the results of the present season from Hairy Vetch, Soja Bean, and Horse Bean, we may insert in tabular form the data respecting these clovers and alfalfa:—

### ANALYSIS of Clovers and Alfalfa, 1896.

| Sown, July 13th. Collected, October 20th. | Composition. | | | Nitrogen. | Weight of Crop Per Acre. | | Amount of certain Constituents Per Acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | Water | Organic Matter. | Ash. | | | | Organic Matter. | Ash. | Nitrogen. |
| | | | | | Tons. | Lbs. | | | |
| Mammoth Red, stems and leaves.. | 79·13 | 17·05 | 3·82 | 0·620 | 6 | 1,310 | 2,269 | 508 | 82 |
| " roots....... ... | 77·57 | 19·41 | 3·02 | 0·662 | 3 | 1,260 | 1,409 | 219 | 48 |
| Total..... ...... ...... .. | | | | | 10 | 570 | 3,678 | 727 | 130 |
| Common Red, stems and leaves.... | 76·24 | 18·84 | 4·92 | 0·718 | 4 | 1,779 | 1,842 | 481 | 70 |
| " roots.............. | 71·22 | 25·61 | 3·17 | 0·784 | 2 | 1,445 | 1,394 | 172 | 47 |
| Total............. ...... | | | | | 7 | 1,224 | 3,236 | 653 | 117 |
| Crimson Clover, stems and leaves.. | 83·32 | 13·91 | 2·77 | 0·382 | 11 | 234 | 2,093 | 602 | 85 |
| " roots............. | 83·87 | 12·92 | 3·21 | 0·304 | 3 | 201 | 801 | 199 | 19 |
| Total.................... | | | | | 14 | 435 | 2,894 | 801 | 104 |
| Alfalfa, stems and leaves .. ....... | 71·63 | 23·81 | 4·56 | 0·671 | 5 | 1,192 | 2,664 | 510 | 75 |
| " roots..................... | 64·74 | 29·47 | 5 79 | 0·557 | 5 | 558 | 3,120 | 613 | 61 |
| Total.................. | | | | | 10 | 1,750 | 5,784 | 1,123 | 136 |

## EXPERIMENTS WITH COVER CROPS, 1903.

In the experiments conducted during the past season by the Horticulturist with cover crops, the following modification was tested. Instead of sowing broadcast, (as has been the custom) the crops under trial—Hairy Vetch, Soja Beans and Horse Beans—were planted in rows 27 inches apart and the spaces between the rows kept cultivated. This was done. as explained at length by the Horticulturist in his report, to serve a dual purpose—the conservation of soil moisture by means of a dry earth mulch. and the production of a crop that might serve as a winter protection to the roots (by holding the snow) and for the enrichment of the soil.

The seed was sown on light, sandy soil in the farm orchard. June 18, and the samples collected for estimation of crop per acre and analysis, on September 21. At this latter date the Hairy Vetch formed a perfect mat or carpet 6 to 8 inches in thickness, entirely covering the ground, but it had not flowered. The Soja Beans were practically 2 feet high. and well branched and possessing many pods. The Horse Beans stood 3½ feet high, having made a vigorous growth, and were well podded.

After the date of collection the weather contined open and mild for several weeks, and no doubt if a further examination had been made in the middle of October larger amounts per acre than those recorded would have been obtained.

The roots in each instance were taken to a depth of 9 inches.

ANALYSIS of Hairy Vetch, Soja Bean and Horse Bean used as Cover Crops, 1903.

| Sown June 18. Collected September 21. | Height or length on date of collection. | | Composition. | | | Nitrogen. | Weight of Crop Per Acre. | | Amount of certain Constituents Per Acre. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Water | Organic Matter. | Ash. | | | | Organic Matter. | Ash. | Nitrogen. |
| | ft. | in. | | | | % | Tons. | Lbs. | Lbs. | Lbs. | Lbs. |
| Hairy Vetch (Vicia villosa) stems and leaves... | 3 | 3 | 82·78 | 15·44 | 1·78 | ·54 | 11 | 1895 | 3689 | 425 | 129 |
| " " " roots.. | ........ | | 86·35 | 12·35 | 1·30 | ·41 | 2 | 345 | 536 | 56 | 18 |
| Total | ........ | | ..... | ..... | ..... | .... | 14 | 240 | 4225 | 481 | 147 |
| Soja Bean (Soja Hispida) stems and leaves. | 1 | 10 | 74·69 | 23·13 | 2·18 | ·57 | 7 | 350 | 3319 | 313 | 82 |
| " " " roots... | ........ | | 80·12 | 18·92 | ·96 | ·48 | 1 | 900 | 549 | 28 | 13 |
| Total | ........ | | ..... | ........ | ..... | .... | 8 | 1250 | 3868 | 341 | 95 |
| Horse Bean (Faba vulgaris, var. equina) stems and leaves .. .. | 3 | 6 | 84·04 | 14·89 | 1·07 | ·43 | 7 | 733 | 2193 | 156 | 63 |
| " " " roots ... | ........ | | 86·72 | 12·47 | ·81 | ·30 | 2 | 852 | 605 | 39 | 15 |
| Total | ........ | | .... | ... .... | ...... | .... | 9 | 1585 | 2798 | 195 | 78 |

*Hairy Vetch.*—This plant gave the heaviest crop of the three under trial. It also furnished the largest amount of nitrogen. Considering the entire plant, we have, from three months' growth, in round numbers 2⅛ tons (4,225 lbs.) of humus-forming material per acre, containing almost 150 lbs. of nitrogen. In these data we have a strong endorsation of the very high opinion expressed by certain horticultural writers regarding the fertilizing value of this plant.

*Soja Bean.*—Though not yielding as heavily as the foregoing, it is undoubtedly a useful orchard cover crop, since when sown in drills it allows of surface cultivation for the conservation of moisture. Moreover, it should prove a good snow-holder, by reason of its upright form of growth and stiff stems. Somewhat more than 1¾ tons (3,868 lbs.) of humus-forming material per acre were obtained, containing almost 100 lbs. of nitrogen.

*Horse Bean.*—Although at the time of collection this crop made the finest appearance of the three, the analytical data place it last in fertilizing value. In total weight of crop the figures show 9¾ tons, approximately, per acre, but owing chiefly to its high percentage of water it contained less organic matter and nitrogen than the Soja Beans. The difference in favour of the latter was approximately 1,000 lbs. of organic matter and 20 lbs. of nitrogen, per acre. There is this, however, to be said in favour of the Horse Bean, that its root system is more extensive than that of the Soja Bean and the plant, being more succulent, would probably decay more quickly the ensuing season. In humus-forming material the figures denote nearly 1½ tons (2,798 lbs.) per acre.

## FODDERS AND FEEDING STUFFS.

### BANNER OATS.

An important consideration in determining the relative feeding values of different varieties of oats lies in the proportion (by weight) of hull to kernel, for the nutritive properties of the former are very small compared with those of the latter.

This subject has already been discussed by Dr. Wm. Saunders, the Director of the Experimental Farms. It, therefore, only remains to say that it is proposed, as time allows, to obtain chemical data both as to kernels and hulls, respecting all the more commonly grown oats in Canada, and that a beginning has been made in this inquiry by an examination of that widely known and highly esteemed variety—the Banner. This has included not only a determination of the relative weight of hull and kernel, but also their complete analysis, together with that of the whole grain. These oats were of the crop of 1902, grown on the Central Experimental Farm.

*Proportion of Kernels to Hulls.*

| | |
|---|---|
| Kernels | 71·92 |
| Hulls | 28·08 |
| | 100·00 |

ANALYSIS of Banner Oats: Whole grain, Kernels and Hulls.

| — | Moisture. | Albuminoids. | Fat. | Carbohydrates. | Fibre. | Ash. |
|---|---|---|---|---|---|---|
| Oats, (whole grain) | 12·74 | 11·22 | 4·82 | 58·84 | 9·47 | 2·91 |
| Kernels | 12·03 | 14·51 | 6·24 | 63·15 | 1·93 | 2·14 |
| Hulls | 10·19 | 2·60 | 0·78 | 49·63 | 31·63 | 5·17 |

The tremendous difference in feeding value between the kernel and the hull is very well brought out by the foregoing data. In albuminoids, or flesh-formers, and in fat or oil—the two most valuable constituents of a feed—*the hull is seen to contain but very small percentages compared with the kernel.* Further, the hull is practically one-third indigestible fibre, which in the kernel does not amount to two per cent. In fact, oat hulls would appear to have a considerably lower feeding value than oat straw.

It has been shown by Dr. Wm. Saunders that considering any one variety of oats, samples differing in weight do so by reason of the relative plumpness and heaviness of the kernel, and not to any extent from variations in the weight of hull. It is, therefore, of moment not only to know the proportion of hull to kernel in the varieties upon the market, but also to purchase the heaviest oats of the variety selected—for this will mean the heavier kernel.

### BRANS AND SHORTS.

These two by-products in the manufacture of flour are by far the most important of all concentrated feeds used in the Dominion to-day. They are produced from Canadian wheats in Canadian mills in large quantities. From their extensive use, from their high nutritive value, as well as from the fact that they are materials rich in nitrogen and ash constituents derived from Canadian soils—and which under careful management are capable of being returned, in a large measure, to the soil—they are materials well worthy of the consideration of our farmers and dairymen.

*Bran.*—As a milk-producer, bran possesses merits peculiarly its own; it has long been recognized as standing in the very front rank for this purpose; indeed, in the opinion of many experienced dairymen it has no equal among meals and milling products for keeping up the milk flow.

This, undoubtedly, is due, in part, to its composition, furnishing, as it does, in large amounts and in excellent proportions those constituents required in the elaboration of milk ; in part, to its high digestibility by the cow, which is furthered by its loose, light, bulky nature, permitting the digestive fluids to readily and easily act upon it and the other foods with which it may be used. It, moreover, has a certain mild mechanical action upon the digestive tract, and particularly in the intestines, that serves to keep the animal from becoming constipated.

Bran consists of the three outer coats of the wheat kernel, together with the aleurone layer immediately underlying them. These outer coats are very fibrous and contain large percentages of phosphates and other mineral constituents; the aleurone layer consists of cells exceedingly rich in protein. Fat also is present in fair amounts, so that all the necessary materials for the production of milk are present. In the internal economy of the animal, a large proportion of these nutrients is digested and, as has been demonstrated by many carefully conducted experiments, subsequently through the blood is transformed into muscle and bone and milk. Its 'nutritive ratio,' that is, the proportion of digestible protein to the digestible fat and carbo-hydrates, is 1 : 3·68, which clearly demonstrates the value of this by-product for furnishing the protein necessary to supplement that in the home-grown coarse fodders (usually characterized by a low protein-content) in order to obtain a balanced ration.

The composition of the bran will vary somewhat according to the character of the wheat (spring or winter) and of the milling, and of the relative freedom of the bran from weed seeds and other foreign matter. Spring wheat seems to yield a bran containing slightly more protein than winter wheat.

*Shorts and Middlings.*—According to Snyder,* 'wheat shorts consist of those outer portions of the wheat kernel which contain less fibre, protein and ash than the parts which make up the bran. This product is practically the fine bran subjected to more complete pulverisation and mixed with some low grade flour. It is more variable in composition than bran, but for some purposes, as pig feeding, is more valuable. When the wheat germ is added to the shorts the product is called middlings or shorts middlings.' Henry, in his work 'Feeds and Feeding,' says: 'Shorts consist of re-ground bran. Middlings contain the finer bran particles and more flour; often with this grade there are incorporated the germs of the wheat grain,' and further, he states, 'Middlings and shorts are terms used interchangeably to some extent. It has become rather common of late to find shorts consisting simply of ground-over bran, almost free from floury particles.' It is evident from these statements that the distinction between bran and shorts, which has been so marked in past times, is now becoming obliterated, and this is borne out to some extent by the appearance and analytical data of the Canadian samples we have examined this year, and which will shortly be discussed.

The introduction of the 'roller' process of milling and the wonderful improvement in bolting and sifting machinery now permits the miller to include practically all beneath the aleurone layer as flour—a most desirable result from his point of view. The germ is usually mixed with the lower grade flours. This means, naturally, that shorts or middlings as we have known them from the old stone mill will soon become a feed of the past. From the farmer's standpoint, and particularly that of the pig feeder, this is perhaps to be regretted, for as food for pigs shorts have always been most highly esteemed, especially in conjunction with skim milk. As an offset to this loss of mealy shorts, we have to recognize that the shorts of the future will be richer in protein and mineral matter, and consequently of greater value for muscle making and the development of the frame. It does not seem likely, however, that it will prove as desirable a feed for pigs and young stock generally.

Before presenting the results obtained recently on Canadian brans and shorts it will be of interest, for the sake of comparison, to insert the average composition of these feeds as obtained by American chemists. The following averages are taken from tables in Henry's 'Feeds and Feeding':—

---

* The Chemistry of Plant and Animal Life (Snyder), p. 306.

| Feed. | No. of Samples. | Water. | Ash. | Protein. | Fibre. | Carbo-hydrates. | Fat. |
|---|---|---|---|---|---|---|---|
| Bran, spring wheat | 10 | 11·5 | 5·4 | 16·1 | 8·0 | 54·5 | 4·5 |
| " winter wheat | 7 | 12·3 | 5·9 | 16·0 | 8·1 | 53·7 | 4·0 |
| Middlings | 32 | 12·1 | 3·3 | 15·6 | 4·6 | 60·4 | 4·0 |
| Shorts | 12 | 11·8 | 4·6 | 14·9 | 7·4 | 56·8 | 4·5 |

We may also insert certain data from Bulletin No. 160 of the New Jersey Experiment Station (1902), which gives the results from the analyses of 91 samples of wheat bran, 49 of which were reported as of winter wheat, 34 of spring wheat, and 8 either mixed or not designated. The composition of 20 samples of middlings are also included:—

| — | Protein. | Fat. | Fibre. |
|---|---|---|---|
| Bran, Winter | 15·96 | 4·63 | 7·51 |
| " Spring | 16·97 | 5·27 | 8·81 |
| Middlings | 15·21 | 3·85 | 2·34 |

The figures from this latter table bear out the contention that spring wheat bran contains more protein than that of winter wheat, though the results from Henry lend little support to that view. Middlings, it will be seen, are slightly lower in protein, fat, fibre and ash constituents than bran, by both sets of results.

### *Canadian Brans.*

To obtain information regarding the composition and relative feeding value of Canadian brans and shorts, we have submitted to analysis a series of samples of these feeds, kindly supplied by certain of the leading milling companies of the Dominion. The results obtained from this investigation may now be considered.

Eight brans have been analysed, the samples in every case being received direct from the mills. In appearance they were clean and bright, the flakes thin and large, and with one or two exceptions particularly free from all mealiness. Several contained a few hulls and occasionally whole grains of wheat or oats, and in three cases a few weed seeds were noticed. They were all free from sweepings and dirt and would undoubtedly be considered of first class quality. The exact character of the wheat from which these brans were prepared could not in the majority of cases be learnt, but we may presume that spring wheat only was used in the Manitoban and Keewatin mills, and also that a large proportion of the wheat of the Ontario mills was of that nature.

*Moisture.*—This constituent is seen to vary from 9·73 per cent to 12·37 per cent—the average from all the samples being 11·07 per cent, a figure somewhat lower than the American average, and pointing, other things being equal, to the higher feeding value of our brans.

It will be observed that in the majority of instances the drier brans are from mills in Manitoba. Only two of the series contain more than 12 per cent water, and these are from Ontario mills. The drier atmosphere of the North-west and the larger proportion of spring wheat used in milling there are, we suppose, the factors that have led to this low water-content.

*Protein.*—This nutrient, the most important of all, varies from 13·25 per cent to 15·31 per cent, the average being 14·52 per cent. Making a comparison with the average for protein in American brans, our figure is seen to be somewhat the lower. Whether this is due in part to differences in structure of the wheat, *e.g.*, greater thickness of the outer fibrous coats, or a thinner aleurone layer in Canadian spring wheat, or whether it is due to some recent improvement or alteration in the milling machinery affecting the proportion of the various products, we are at present unable to say, but this we hope at some future time to investigate.

*Fat.*—Certain differences apparently exist between the various samples as regards fat content, these differences for the most part, however, are not of any great magnitude. The general average for the fat is practically the mean of the figures quoted by Henry for American brans, though somewhat lower than the results from New Jersey.

*Carbo-hydrates.*—The nitrogen-free extract (chiefly starch) is seen to be very fairly uniform throughout the series and to give an average practically identical with that quoted from American sources.

*Fibre.*—Here we find a slight increase over the percentage given by American chemists. If on further work brans from Canadian spring wheats in general show this higher fibre content it will be of interest to ascertain the cause. If one or other of the theories already advanced when discussing the protein content be found correct, we shall at the same time receive an explanation for this increased percentage of fibre.

*Ash.*—The average percentage of ash obtained agrees very closely with that given for pure brans. An inspection of the data shows that all the samples were free from mill sweepings, dirt, sand, &c.

Analysis of Brans—1903.

| Name of Milling Firm. | Address. | Moisture. | Protein. | Fat. | Carbo-hydrates | Fibre. | Ash. |
|---|---|---|---|---|---|---|---|
| | | % | % | % | % | % | % |
| Ogilvie Flour Mills | Winnipeg, Man | 9·73 | 14·00 | 4·55 | 55·18 | 10·74 | 5·80 |
| Alexander & Law Co | Brandon, Man | 10·57 | 15·19 | 5·19 | 53·83 | 9·80 | 5·42 |
| Lake of the Woods | Portage la Prairie, Man | 9·89 | 14·81 | 4·68 | 53·75 | 10·62 | 6·24 |
| " | Keewatin, Ont | 10·83 | 14·56 | 3·60 | 54·56 | 10·93 | 5·52 |
| Goldie Milling Co | Galt, Ont | 12·70 | 13·25 | 3·78 | 54·61 | 9·66 | 6·00 |
| Tilsonburg Milling Co. | Tilsonburg, Ont | 11·81 | 14·19 | 4·17 | 54·45 | 9·70 | 5·68 |
| Kingston Milling Co. | Kingston, Ont | 10·65 | 15·31 | 4·87 | 52·96 | 10·35 | 5·86 |
| Winchester Roller Mills | Winchester, Ont | 12·37 | 14·84 | 4·12 | 54·20 | 9·28 | 5·19 |
| | Average | 11·07 | 14·52 | 4·37 | 54·19 | 10·14 | 5·71 |

*Canadian Shorts.*

The analytical results of nine samples of shorts are presented. In eight of the nine cases they were received from the mills forwarding the brans. They were all labelled 'shorts,' the term middlings not being used either in their description or designation.

Though the samples differed somewhat as regards fineness and, to some extent, as to mealiness, we may safely state that they all resembled fine bran rather than the floury, mealy shorts of the old stone mills.

*Protein.*—The percentage of protein is seen to be considerably higher than in the case of the brans. This we presume may be due to more of the aleurone layer and less of the outer fibrous coat entering into the composition than in the case of the brans. This increase in protein-content amounts to practically 1·5 per cent. With the exception of one sample, they are all over 15 per cent protein, ranging from 15·15 per cent to 17 per cent, the average being 15·93 per cent.

*Fat.*—In this constituent also the shorts give higher figures than the brans, the average for the former being 5·24 per cent and for the latter 4·37 per cent. In the comparatively high fat-content we have confirmatory evidence that these shorts are more closely related to bran than to the old stone mill shorts.

*Carbo-hydrates.*—Considering the average, there is about 5 per cent more carbo-hydrates (starch) in the shorts than in the bran. This points to a difference in their structural composition, and clearly indicates that we cannot conclude that the shorts are merely finely ground bran. This extra starch makes the shorts more mealy than the bran, and consequently better suited for certain classes of farm stock, as already pointed out in our general remarks on shorts and middlings.

*Fibre and Ash.*—In both of these constituents the shorts show much lower percentages than the brans. The fibre of the shorts is about one-half and the ash is approximately two-thirds, of that in the bran. Since it is the outer coats of the wheat kernel that have a high fibre-content and are particularly rich in ash, it is obvious that these shorts are not to be considered as entirely made up of finely ground bran.

ANALYSIS of Shorts, 1903.

| Name of Milling Firm. | Address. | Moisture. | Protein. | Fat. | Carbo-hydrates | Fibre. | Ash. |
|---|---|---|---|---|---|---|---|
| | | % | % | % | % | % | % |
| Ogilvie Flour Mills ........ | Winnipeg, Man...... | 8·88 | 15·62 | 4·83 | 59·07 | 7·51 | 4·09 |
| Alexander & Law Co ..... | Brandon, Man........ | 9·83 | 17·00 | 6·23 | 59·12 | 4·43 | 3·39 |
| Lake of the Woods ........ | Portage la Prairie, Man | 9·54 | 16·03 | 5·97 | 59·15 | 5·41 | 3·90 |
| " ........ | Keewatin, Ont ....... | 10·38 | 16·25 | 5·50 | 57·40 | 6·51 | 3·96 |
| Goldie Milling Co ......... | Galt, Ont...... ...... | 12·34 | 14·62 | 4·54 | 58·76 | 5·74 | 4·00 |
| Tilsonburg Milling Co. .... | Tilsonburg, Ont....... | 11·60 | 16 75 | 5·61 | 57·55 | 4·77 | 3·72 |
| Kingston Milling Co. .. | Kingston, Ont... .... | 10·81 | 16·41 | 5·38 | 60·07 | 3·82 | 3·51 |
| Winchester Roller Mills.... | Winchester, Ont...... | 12·13 | 15 15 | 3·98 | 60·50 | 4·80 | 3·44 |
| Woodstock Roller Mills.... | Woodstock, N. B. .... | 7·58 | 15·56 | 5·09 | 64·56 | 4·11 | 3 10 |
| | Average........ | 10·34 | 15·93 | 5·24 | 59·58 | 5·23 | 3·68 |

Concluding this comparison of Canadian brans and shorts, we may state that the analytical data of this investigation clearly indicate the higher feeding value of the shorts. Their larger percentages of protein, of fat, and of carbo-hydrates and their lower fibre content, all point in the same direction, and furnish most conclusive and satisfactory proof of their superiority.

## MOLASSINE MEAL.

This feeding stuff, imported from England, is prepared from crude molasses and peat or moss—the latter constituent acting simply as an absorbent and not adding in any way to the nutritive value of the compound, though counteracting, it is claimed, the tendency to 'looseness' frequently induced when molasses alone is fed.

As received at the farm, this 'meal' was in the form of a loosely held together mass, brownish black, with all the appearance of an agglutinated peat. It was somewhat moist and slightly sticky, but readily broken into granules on handling.

Its analysis furnished the following data:—

| | |
|---|---|
| Moisture | 11·74 |
| Water soluble extract | 59·88 |
| Ash | 8·92 |

In the water soluble extract:—

| | |
|---|---|
| Cane sugar | 45·37 |
| Glucose | 5·40 |
| Nitrogenous organic matter | 5·13 |
| Ash (chiefly potash salts) | 6·30 |

On comparing these results with those from an analysis made in England, we find a considerable difference in moisture-content, the present sample containing some 8 per cent less water, which necessarily means a higher value for the meal. This drying out may merely be accidental and due to the exposure of the sample to the drier air of this country. We presume it would not occur to such an extent when the feed is imported in bulk.

The constituent of importance in such compounds is sugar, which in the animal economy has a very high value as a source of energy and heat, and in the formation of fat. Its ready solubility, and the ease with which it is digested and assimilated, place sugar before all other carbo-hydrates, starch, gum, &c., for these purposes.

Molasses, and more particularly molasses feeds, of various kinds, have been used for some time in Europe in the feeding of horses, cattle and swine, and when judiciously employed and in conjunction with a sufficiency of nitrogenous matter, have given excellent results.* Apart from their direct food value, they are stated to act beneficially in increasing the appetite, stimulating the digestion, and keeping the animal in a thrifty condition.

Though containing a certain amount of nitrogenous material, molassine meal does not in itself possess a sufficiency of protein for the animal's requirements. Hence, it can only serve as a part of the ration, and is most economically employed as a substitute for say one-third to one-half of the usual grain feed.

The sample of molassine meal here reported upon was received from Messrs. Grassett & Reid, Toronto.

## IMPROVED MOLASSES CATTLE FOOD.

This newly introduced feeding stuff is made by the Dresden Sugar Company, Limited, Dresden, Ont., and constitutes what may be termed a by-product in the manufacture of sugar from beets. It is prepared from two residues in the process—the exhausted beet pulp and waste molasses. These, by the aid of suitable machinery to accomplish the necessary pressing, drying and mixing are greatly concentrated and converted into a palatable fodder. As placed upon the market, it has the appearance of dry pulp, chips or flakes, quite loose and without any stickiness so noticeable in other feeding stuffs into which molasses has entered as a component. We have analysed several samples of this feed, together with a sample of the untreated dried beet pulp, and append our results. The particulars are as follows:—

No. 1.—Dried beet pulp (collected at the factory by Dr. Saunders).

No. 2.—Improved Molasses Cattle Food (collected at the factory by Dr. Saunders).

No. 3.—Improved Molasses Cattle Food, taken from a 75-lb. bag sent to the Experimental farm.

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* A short article on this subject, including an analysis of molasses, is given in the Report of the Chemical Division, Experimental Farms, 1898.

No. 4.—Improved Molasses Cattle Food, taken from one bag of 100 lbs. in a consignment of 4 tons sent to the Experimental farm for a feeding trial.

No. 5.—Taken after mixing 20 bags of above mentioned consignment.

ANALYSIS of Dried Pulp and Molasses Cattle Food from Dresden Sugar Company, Limited, Dresden, Ont.

| — | No. 1. | No. 2. | No. 3. | No. 4. | No. 5. |
|---|---|---|---|---|---|
| | % | % | % | % | % |
| Moisture | 7·61 | 4·59 | 4·31 | 3·99 | 4·36 |
| Crude protein | 7·62 | 8·75 | 8·37 | 8·03 | 8·28 |
| Fat | ·40 | ·16 | ·09 | ·10 | ·74 |
| Carbo-hydrates | 59·49 | 65·44 | 66·07 | 64·38 | 64·61 |
| Fibre | 20·85 | 14·42 | 15·52 | 18·73 | 16·36 |
| Ash | 4·03 | 6·64 | 5·64 | 4·77 | 5·65 |
| | 100·00 | 100·00 | 100·00 | 100·00 | 100·00 |
| Aqueous extract, dried at 105° C | 9·58 | 35·11 | 24·90 | 12·58 | 22·17 |
| Ash in aqueous extract | 1·02 | 3·80 | 2·55 | 1·31 | 1·97 |
| Cane sugar | 6·92 | 25·85 | 17·06 | 9·19 | 13·51 |
| Glucose (reducing sugar) | 0·88 | 1·11 | 3·78 | 0·63 | 2·05 |
| Non-albuminoid nitrogenous substances | .......... | 2·56 | 2·99 | 0·31 | ·84 |
| Albuminoids | 7·62 | 6·19 | 5·38 | 7·72 | 7·44 |

*Dried Pulp.*—This is the first product in the manufacture of the 'Improved Molasses Cattle Food.' It is stated that 100 lbs. of the freshly exhausted beet pulp yield approximately 5 lbs. of the 'Dried Pulp.' This agrees very well with our analysis of the fresh pulp made some years ago, which was as follows:—

*Analysis of Fresh Pulp.*

| | |
|---|---|
| Water | 95·72 |
| Crude protein | ·51 |
| Carbohydrates | 2·36 |
| Fat | 0·01 |
| Fibre | 1·26 |
| Ash | ·14 |
| | 100·00 |

Roughly speaking, therefore, we may say that the dried pulp has, weight for weight, 20 times the feeding value of that of the fresh pulp. Notwithstanding this great concentration, dried pulp, by reason of its low protein and fat and its high fibre is not in the same class as the various meals and concentrated feed stuffs. It is rather to be considered with those generally known as coarse fodders—from many of which it, however, differs in being much more digestible and palatable. We may safely assert from a consideration of its composition, its digestibility and palatability, that 'dried pulp' has a distinct feeding value and would constitute a wholesome addition to the ration when roots or ensilage are scarce.

*Improved Molasses Cattle Food.*—From the practical feeding standpoint this differs from 'Dried Pulp,' simply in containing more sugar, derived from the added molasses. This undoubtedly greatly enhances the feeding value, since sugar is readily assimilable and performs most important functions in the body in the production of heat and the formation of fat.

From the four samples so far anlysed it would not seem that uniformity in composition has yet been obtained. This is most probably due to the fact that the process of manufacture is new and not as yet thoroughly worked out in all its details for the best results, that is, as far as obtaining uniformity of product is concerned. The differences referred to lie chiefly in the sugar-content ; in other words, in the proportion of molasses that had been dried with the pulp. This will clearly be seen by a reference to the table of data. The solid matter dissolved out of the feed by cold water (aqueous extract dried at 105° C) is seen to vary from 35·11 per cent to 12·58 per cent; containing from 25·85 per cent to 9·19 per cent cane sugar. The extracted matter in the dried pulp is fairly constant at about 9·5 per cent, containing nearly 7 per cent cane sugar. The differences here noted in the Improved Molasses Cattle Food must therefore be due to the varying amounts of molasses with which the pulp has been dried. This is further supported by the data for the ash in the extract and those for the non-albuminoid nitrogenous substances—the latter being practically absent in the dried pulp. We have dwelt upon these differences because, as stated in the preceding chapter, the sugar content is the real measure of the feeding, and we might add the fattening, value of these preparations. It has already been remarked that in addition to its function as a heat-producer, sugar is an excellent fattener. It would seem that provided the animal has a sufficiency of nitrogenous material for its requirements, the addition of sugar to the ration greatly enhances the latter's fattening properties.

The crude protein is slightly higher in the Improved Molasses Cattle Food than in the Dried Pulp, but by the further differentiation of this into the albuminoids or true flesh-formers and the non-albuminoid nitrogenous substances (nutrients of much lower feeding value) it will be seen that the percentage of the former is really greater in the Dried Pulp. The nitrogenous substances in molasses are practically all of the non-albuminoid nature, and consequently the addition of molasses to the pulp lessens the proportion of the true albuminoids present in the finished product.

The percentage of moisture in this food is exceedingly low—in fact, considerably lower than that of other feeding stuffs ordinarily upon the market. This, of course, means a larger percentage of dry matter. This dryness enhances its nutritive qualities and keeping properties besides facilitating convenience in using.

Its proportion of fibre—the nutrient of least value in a fodder—is somewhat lower than that of the Dried Pulp. This is occasioned by the addition of molasses, which contains no fibre. The larger the proportion of molasses contained in this food, the more sugar—which is the element of value—and the less fibre will it possess.

As the manurial value of a fodder is a matter of some moment, it should be pointed out that the mineral matter of molasses consists chiefly of potash—an important element of plant food. This will appear largely in the urine, and consequently sufficient litter should be used to absorb all the liquid manure if this potash is to be saved for crop use.

## COTTON SEED MEAL.

We had occasion last year to call the attention of our readers to the fact that an inferior brand of this valuable feeding stuff had appeared on the Canadian market (see page 148, report of the Experimental Farms, 1902). From samples received during the past year, it is evident that this low grade meal is still being sold in the Maritime provinces and at prices very little below those of the genuine article. It may be distinguished by those accustomed to handling cotton seed meal, as darker in colour and coarser than good quality meal. Such a sample was received from Mr. H. H. Bartlett, St. Andrews, N.B., and stated to have been purchased in St. Andrews from an agent of the Florida Cotton Oil Company, Jacksonville, Fla. This, it will be remembered, is the firm from which the inferior brand analysed and reported upon last year was obtained:—

*Analysis.*

| | |
|---|---|
| Moisture | 10·11 |
| Protein (albuminoids) | 23·81 |
| Fat | 5·98 |

That this meal is very much inferior to genuine cotton seed meal will be obvious when it is stated that the latter contains in the neighbourhood of 42 per cent protein and 13 per cent fat.

Two samples were received from Mr. Thos. B. Smith, Truro, N.S., and also submitted to analysis. They were taken from the one consignment (2,000 lbs.), but differed from one another considerably in depth of colour. The meal was labelled: 'Canary' Brand Cotton Seed Meal, manufactured for R. W. Biggs & Co., Memphis, Tenn.

*Analysis.*

| | No. 1 Light coloured. | No. 2 Dark coloured. |
|---|---|---|
| Moisture | 6·71 | 6·74 |
| Protein | 43·06 | 39·43 |
| Fat | 11·47 | 8·10 |

No. 1 meal, though somewhat below the standard in fat, is evidently genuine, but such is not the case with No. 2. Though not as seriously adulterated as the Florida Cotton Oil Company's meal, this is seen to be decidedly inferior, both as to protein and fat, and consequently should not be sold at the same price as No. 1 meal.

The consumption of concentrated feed stuffs steadily increases year by year, and will continue to do so. Their price, in the majority of instances, is high compared with other fodders, and for this reason alone it is of paramount importance that there should be no falling off in their feeding value. Many of these feeds are by-products, and consequently variable in their composition or at least capable of being mixed with inferior materials. As instances, we may cite oat feeds, from oat meal manufacture; gluten feeds, from the starch factory; and cotton seed meal. Analyses of these in the Farm laboratories have frequently shown that the selling price does not agree with their nutritive value. Further, it is often difficult, or indeed impossible, for a farmer to judge of the value of such feeds by mere inspection; an analysis is absolutely necessary to learn their percentages of protein and fat, the two constituents of greatest importance from the feeding standpoint.

For these reasons, the writer is of the opinion that such by-products should be sold under a guarantee and that there should be an official examination and analysis of them, similar to that in vogue for fertilizers. If it is necessary to protect the farmer in connection with the purchase of plant food, it seems equally essential that there should be a like protection in the purchase of animal food. During the past few years many of the states of the American Union have passed laws compelling the manufacturer or vendor of such feeds to attach to every consignment a tag on which is printed the guaranteed analysis, showing the percentages of protein and fat the feed contains. It appears that the time is about at hand when we shall require that the same information and protection should be given to Canadian farmers.

## THE RELATIVE VALUE OF ROOTS.

For several years past we have examined the principal field roots, with the object of ascertaining how far their nutritive value may vary from season to season, as well as to obtain data which would enable us to judge of their relative feeding properties.

The chief varieties of mangels analysed were: Gate Post, Giant Yellow Globe, Giant Sugar Feeding, Half Long Sugar Rosy, and Half Long Sugar White. Of carrots, the varieties were: Short White and Half Long White. Of sugar beets: Danish Improved. Of turnips: Skirvings. Of Swedes: Selected Purple Top.

ANALYSIS of Roots, C. E.F., Ottawa, 1903.

| Variety. | | Water. | Dry Matter. | Sugar in Juice. | Average weight of one root. | |
|---|---|---|---|---|---|---|
| | | % | % | % | lbs. | ozs. |
| Mangel—Half-long Sugar Rosy | Sugar mangels. | 87·55 | 12·45 | 9·61 | 2 | 8 |
| Half-long Sugar White | | 86·54 | 13·46 | 9·82 | 1 | 13 |
| Giant Sugar Feeding | | 85·26 | 14·74 | 10·40 | 2 | 8 |
| Giant Yellow Globe | | 89·11 | 10·89 | 6·17 | 3 | 13 |
| Gate Post | | 87·07 | 12·93 | 7·38 | 3 | 3 |
| Carrots—Improved Short White | | 89·60 | 10·40 | 4·77 | 1 | 10 |
| Half-long White | | 90·17 | 9·83 | 2·52 | 1 | 15 |
| Turnips—Skirvings | | 89·03 | 10·97 | 2·78 | 2 | 9 |
| Selected Purple Top | | 88·99 | 11·01 | 2·77 | 5 | 6 |

The results are, on the whole, very satisfactory, showing that notwithstanding the abnormal character of the season most of the varieties are very little behind their average in dry matter and sugar.

The so-called sugar mangels again maintain their superiority, the richest of them, as in 1902, being the 'Giant Sugar Feeding' mangel, but the varieties, 'Half Long Sugar Rosy' and 'Half Long Sugar White,' follow very closely. They are all evidently roots of a high feeding value.

The following results, as regards dry matter and sugar of the mangels 'Gate Post' and 'Giant Yellow Globe,' during the past four years, will prove interesting. They show that despite changes due to season, &c., the relative position of these two well known roots has been maintained throughout.

DRY Matter and Sugar in Mangels.

| — | 1900. | | 1901. | | 1902. | | 1903. | |
|---|---|---|---|---|---|---|---|---|
| | Dry Matter. | Sugar in Juice. | Dry Matter. | Sugar in Juice. | Dry Matter. | Sugar in Juice. | Dry Matter. | Sugar in Juice. |
| | % | % | % | % | % | % | % | % |
| Gate Post | 11·14 | 6·15 | 9·41 | 4·15 | 13·90 | 9·39 | 12·93 | 7·38 |
| Giant Yellow Globe | 8·19 | 2·64 | 9·10 | 4·08 | 10·24 | 5·24 | 10·89 | 6·17 |

We have not the same continuous series of results for the carrots and turnips examined, and shall not, therefore, at the present time undertake any discussion of the feeding values of the different varieties.

## SUGAR BEETS.

The principal varieties of sugar beets grown on the several Experimental Farms have, as in past years, been examined. The results will be found in the subjoined table; the particulars of growth are also presented in tabular form.

### SUGAR BEETS grown on the Dominion Experimental Farms, 1903.

| Variety. | Locality. | Percentage of Sugar in Juice. | Percentage of Solids in Juice. | Coefficient of Purity. | Average weight of one Root. | |
|---|---|---|---|---|---|---|
| | | | | | Lbs. | Oz. |
| Vilmorin's Improved | Nappan, N. S. | 16·29 | 19·55 | 83·3 | 0 | 14 |
| 〃 〃 | Ottawa, Ont. | 15·61 | 16·90 | 92·3 | 1 | 8 |
| 〃 〃 | Brandon, Man | 11·36 | 15·41 | 73·7 | 1 | 4 |
| 〃 〃 | Indian Head, N.W.T | 15·52 | 18·27 | 84·9 | 1 | 3 |
| 〃 〃 | Agassiz, B. C. | 17·47 | 21·08 | 82·8 | 1 | 15 |
| Klein Wanzleben | Nappan, N. S. | 14·23 | 18·80 | 75·7 | 1 | 1 |
| 〃 〃 | Ottawa, Ont. | 15·12 | 17·38 | 86·9 | 1 | 9 |
| 〃 〃 | Indian Head, N.W.T | 16·19 | 20·80 | 77·8 | 1 | 1 |
| 〃 〃 | Agassiz, B. C. | 17·34 | 21·06 | 82·3 | 2 | 3 |
| French "Very Rich" | Nappan, N. S. | 15·46 | 19·00 | 81·3 | 0 | 15 |
| 〃 〃 〃 | Indian Head, N.W.T | 16·90 | 20·60 | 82·0 | 0 | 15 |
| 〃 〃 〃 | Agassiz, B. C. | 17·53 | 22·00 | 79·6 | 2 | 4 |
| Danish Improved | Nappan, N. S. | 11·65 | 15·58 | 74·7 | 1 | 1 |
| 〃 〃 | Ottawa, Ont. | 13·49 | 15·74 | 85·7 | 1 | 6 |
| 〃 〃 | Indian Head, N.W.T | 11·24 | 14·56 | 77·1 | 1 | 8 |
| 〃 〃 | Agassiz, B. C. | 11·42 | 15·94 | 71·6 | 2 | 3 |
| Red Top Sugar | Nappan, N. S. | 12·37 | 16·80 | 73·6 | 1 | 2 |
| 〃 〃 〃 | Ottawa, Ont. | 11·02 | 13·32 | 82·7 | 1 | 8 |
| 〃 〃 〃 | Indian Head, N.W.T | 11·43 | 14·40 | 79·3 | 1 | 7 |
| 〃 〃 〃 | Agassiz, B. C. | 8·14 | 13·67 | 59·5 | 3 | 12 |
| Improved Imperial | Nappan, N. S. | 10·47 | 17·69 | 59·1 | 1 | 1 |
| 〃 〃 | Ottawa, Ont. | 12·19 | 14·33 | 85·0 | 1 | 12 |
| 〃 〃 | Indian Head, N.W.T | 13·60 | 16·97 | 80·1 | 1 | 9 |
| 〃 〃 | Agassiz, B. C. | 10·33 | 14·87 | 69·6 | 4 | 7 |
| Danish Red Top | Nappan, N. S. | 11·48 | 15·77 | 72·7 | 1 | 4 |
| 〃 〃 〃 | Ottawa, Ont. | 11·63 | 14·12 | 82·3 | 1 | 9 |
| 〃 〃 〃 | Indian Head, N.W.T | 11·49 | 15·35 | 74·8 | 1 | 9 |
| 〃 〃 〃 | Agassiz, B. C. | 10·48 | 15·31 | 68·4 | 3 | 4 |
| Royal Giant | Nappan, N. S. | 9·43 | 14·40 | 65·4 | 1 | 12 |
| 〃 〃 | Ottawa, Ont. | 11·03 | 12·95 | 85·1 | 1 | 8 |
| 〃 〃 | Agassiz, B. C. | 11·04 | 15·91 | 69·3 | 3 | 3 |
| Name unknown, seed from Mr. C. N. Bell | Indian Head, N.W.T | 17·45 | 21·40 | 81·5 | 1 | 3 |

NOTE—It should be observed that of all the varieties here reported upon the Vilmorin's Improved Klein Wanzleben and the French "Very Rich" are those only commonly employed for sugar extraction.

### SUGAR BEETS grown on the Experimental Farms, 1903—Particulars of Growth.

| Locality. | Date. | | Distance between | | | Remarks |
|---|---|---|---|---|---|---|
| | Sowing. | Pulling. | Rows. | | Plants in Row. | |
| | | | Ft. | In. | In. | |
| Experimental Farm— | | | | | | |
| Nappan, N.S. | May 15. | Oct. 22. | 2 | 0 | 12 | Light clay loam; manured fall 1902. |
| Ottawa, Ont. | ...... | ......... | ... | ... | ....... | Moderately heavy loam in excellent condition. |
| Brandon, Man. | June 1. | Sep. 21 | 3 | 0 | 9 | Black vegetable loam; manured two years ago. |
| Indian Head, N.W.T. | May 26. | Oct. 9. | 2 | 6 | 10 | Clay loam; 15 loads of rotted manure to the acre. |
| Agassiz, B.C. | 〃 7. | 〃 22. | 2 | 6 | 9 | Sandy loam; clover stubble ploughed in fall of 1902. |

*Nova Scotia, Nappan.*—The first four mentioned beets in the table—Vilmorin's Improved, Klein Wanzleben, French 'Very Rich' (Très Riche) and Danish Improved—

practically comprise the varieties now grown for factory purposes. Their sugar-content and purity this year do not differ widely on the whole from those reported for this locality in 1902, though certain individual variations are to be observed. Thus, the average percentage of sugar, as calculated from the four varieties, is 14·44 for 1902 and 14·41 for 1903.

*Ontario, Ottawa.*—The exceptional, and in many respects unfavourable, season experienced here this year—a protracted drought in the spring and early months followed by a somewhat excessive rainfall at the time when the beets were maturing and storing up sugar—has materially influenced both the sugar-content and the purity of the beets. In nearly every instance, this season's results are lower than those of last year. Averaging the results from Vilmorin's Improved, Klein Wanzleben and Danish Improved, we obtain the following results:—

| | | |
|---|---|---|
| 1902— | Percentage of sugar in juice | 16·00 |
| | Co-efficient of purity | 91·0 |
| 1903— | Percentage of sugar in juice | 14·74 |
| | Co-efficient of purity | 88·3 |

*Manitoba, Brandon.*—Only one variety was examined from this district—Vilmorin's Improved. The results are exceedingly low for this excellent beet, indicating that conditions were unfavourable for a root suitable for factory purposes.

*North-west Territories, Indian Head.*—The results from this farm show a decided improvement over those obtained last year. Thus, we find the average sugar content in the four varieties first on the list was 13·97 per cent in 1902, whereas, this season it is 14·96 per cent. It is of interest to note that a variety, the seed of which was sent by Mr. C. N. Bell, but the name of which is unknown, was found to contain 17·45 per cent of sugar.

*British Columbia, Agassiz.*—In spite of the fact that most of the roots were much larger than is recommended for factory purposes, the varieties, Vilmorin's Improved, Klein Wanzleben, French Very Rich, and Danish Improved, had a most satisfactory sugar content. The average of the three first mentioned is 17·45 per cent, and the average of the first four (including Danish Improved, the roots of which were altogether too heavy) is 15·94 per cent.

*Southern Alberta, Raymond.*—A sample of Klein Wanzleben, forwarded by the Knight Sugar Company, who have established a factory at this place (in operation for the first time this autumn) gave the following results:—

| | |
|---|---|
| Percentage of sugar in juice | 20·40 |
| Co-efficient of purity | 80·79 |
| Average weight of one root | 1 lb. 3 oz. |

As the sample is stated to be representative of a field of 30 acres, we must conclude that the crop will prove highly satisfactory for sugar extraction.

The following particulars have been forwarded by the Knight Sugar Company: 'Variety of beet, Klein Wanzleben, sown May 28, pulled October 31. Distance between rows, 20 inches; distance between plants in row, 10 inches. Clay loam. No manure, no irrigation. Sod broken up in the autumn of 1901; disced and reploughed in autumn of 1902, preparatory for spring planting. This field of 30 acres yields 12 tons per acre.'

*Northern Alberta, Strathcona and vicinity.*—In the following table are given the data from the examination of 5 samples received from the Secretary of the Board of Trade, Strathcona:—

ANALYSIS OF SUGAR BEETS—Northern Alberta.

| Number. | Locality. | Variety. | Marks. | Percentage of Sugar in Juice. | Percentage of Solids in Juice. | Coefficient of Purity. | Average weight one Root. |
|---|---|---|---|---|---|---|---|
| | | | | | | | Lbs. Oz. |
| 1 | Strathcona | Danish Improved | J. F. | 9·37 | 12·97 | 72·24 | 1 6 |
| 2 | " | " " | W. F. | 10·84 | 13·55 | 80·00 | 1 5 |
| 3 | Robert Hill | " " | M. R. | 6·75 | 10·72 | 62·96 | 2 10 |
| 4 | " | " " | W. M. | 9·73 | 13·56 | 71·75 | 1 6 |
| 5 | Ellerslie | K. Wanzleben | J. G. | 11·74 | 14·92 | 78·68 | .. 13 |
| 6 | Clover Bar | " | G. A. C. | 14·37 | 19·91 | 72·17 | .. 15 |
| 7 | Rabbit Hill | Wanzleben and Danish Imp. | J. J. S. | 14·37 | 19·97 | 72·00 | 1 3 |
| 8 | Clearwater | K. Wanzleben | W. L. | 14·38 | 19·65 | 72·23 | 1 1 |

Nos. 1-5.—These results are not indicative of good factory beets; indeed, they are much too low to allow of profitable sugar extraction. In one instance (No. 3) the roots were too large, but even allowing for this, it is evident that the unfavourable season, heavy rains and low temperatures prevailing in the late summer months when the beet matures, had a disastrous effect upon the sugar content. Last year (1902) 4 samples of Klein Wanzleben from the same locality were tested and gave data of a much more satisfactory character.

Nos. 6, 7 and 8.—These three samples are practically identical, the differences being insignificant. Though not exceeding in sugar content a moderate average, they are decidedly superior to samples Nos. 1 to 5, which had been received and tested some three weeks earlier.

SUGAR BEETS—Northern Alberta, Strathcona and Vicinity.

| Number. | Name. | Locality. | Variety. | Dates. | | Distance Between. | | Remarks. |
|---|---|---|---|---|---|---|---|---|
| | | | | Sowing. | Pulling. | Rows. | Plants. | |
| 1 | Jas. Fisher | Strathcona | Danish Imp. | June 6 | Oct. 15 | 18 | 7 | Soil rather poor. |
| 2 | Wm. Fitzpatrick | " | " | " 2 | " 3 | 16 | 9 | Black clay loam, fairly good. |
| 3 | M. Reynolds | Robert Hill | " | " 2 | " 13 | 18 | 8 | Heavy black loam, new land. |
| 4 | Wm. Magee | " | " | " 5 | " 10 | 22 | 7 | Heavy clay loam, lying low. |
| 5 | J. Govenlock | Ellerslie | K. Wanzleben | May 28 | " 10 | 16 | 9 | Heavy black loam. |
| 6 | G. A. Coff | Clover Bar | " | June 4 | " 14 | ...... | ...... | Black loam. |
| 7 | J. J. Scribner | Rabbit Hill | Danish Imp. | " 6 | " 20 | ...... | ...... | |
| 8 | W. Loughridge | Clear Water | K. Wanzleben | May 29 | " 19 | ...... | ...... | Rich black loam. |

*Wallaceburg Sugar Company, Limited, Wallaceburg, Ont.*—A sample of beets (Klein Wanzleben) forwarded from the factory of the Wallaceburg Sugar Co., Limited, afforded the following data:—

| | |
|---|---|
| Percentage of sugar in juice | 15·61 |
| Percentage of solids in juice | 19·26 |
| Co-efficient of purity | 81·05 |
| Average weight of one root | 2 lbs. 5 oz. |

As to richness in sugar and purity, these beets are of excellent quality, and this in spite of their weight being somewhat above that usually recognized as best for factory purposes.

*Prince Edward Island, Charlottetown.*—Two samples of sugar beets grown on the provincial farm near Charlottetown, were forwarded by Mr. E. J. McMillan, Secretary of Agriculture, Charlottetown, P. E. I., who writes, 'The yield was so small, owing to damage to the young plants by cut worms, as to be scarcely worth reporting. These roots were taken from a portion of the plot which escaped being cut down.'

| Variety. | Sugar in Juice. | Solids in Juice. | Coefficient of Purity. | Average Weight of one Root. |
|---|---|---|---|---|
| 1. Vilmorin's Improved | 19·93 | 24·35 | 81·64 | 1 lb. 0 ozs. |
| 2. Klein Wanzleben | 12·07 | 17·33 | 69·64 | 1 " 2 " |

As the roots of sample No. 1 were somewhat shrivelled, the sugar content, as here reported, is no doubt slightly higher than in the beet as pulled. The evidence, however, is sufficiently clear and conclusive of the high quality of these beets.

No. 2 is below the average and not sufficiently rich for factory use. If grown under similar conditions to No. 1, it seems doubtful if the seed were really of the Klein Wanzleben variety, which usually gives much higher results.

In forwarding the beets, Mr. E. J. McMillan, writes as follows: 'Both samples were grown side by side on a rich loam soil; the previous crop was grain. The land was ploughed in the fall and again in the spring, when a dressing at the rate of thirty cart-loads per acre of barn-yard muck and well rotten manure was turned under. The surface was well cultivated and the seed sown in rows, 26 inches apart, on May 25. The plans were thinned to about 8 inches apart in the rows. Cutworms completely destroyed a portion of the plots so that the rate of yield could not be determined. The roots were pulled in the last week of October, and were found to be very rough. We hope to overcome this in another year by more careful cultivation.'

## NATURALLY-OCCURRING FERTILIZERS AND WASTE PRODUCTS.

### SWAMP MUCK: ITS NATURE AND TREATMENT.

Attention has been repeatedly directed in the past reports of this Division to the agricultural value of swamp muck, black muck, peat, bog mud and allied materials, rich in organic matter, and from a large correspondence we have reason to believe that many farmers, more particularly in the older provinces, are now employing these deposits and finding in them a useful source of humus and nitrogen. Requests for information as to the nature and uses of these naturally-occurring fertilizers, however, continue to be received, and a concise account of the several ways in which they may be advantageously treated, seems to be in constant demand. We accordingly offer the following statements and suggestions in the hope that they may prove of benefit to our readers.

### *Origin and Nature of Swamp Deposits.*

The accumulation of the semi-decayed vegetable matter known as peat, swamp muck, &c., is due to stagnant water. Swamps and bogs are the sites of former lakes or ponds, or possibly mere depressions covered by water, which have been filled up by the gradual encroachment of aquatic or semi-aquatic vegetation from their shores. Successive generations of mosses, and other water-loving plants, starting in the shallows and drawing their food supply year after year from the remains of the previous season's growth, have gradually pushed out towards the middle of these bodies of water, until in many instances the lake or pond has entirely disappeared. Under such conditions, though there is a certain amount of decomposition, a large proportion of the humus conserved is especially rich in nitrogen. In this way, vast deposits have accumumlated, which may be utilized to furnish vegetable matter (humus) and nitrogen to both clays and sands deficient in these valuable constituents.

### *Uses and Treatment of Peat and Muck.*

Speaking generally, the application of these materials in the crude and raw condition is not to be advised, for their plant food does not exist in immediately available forms. Fermentation is necessary to set it free. Further, the mode of occurrence develops acid, and as acidity or sourness is more or less injurious to ordinary farm crops, it is desirable to correct this quality before the muck is applied to the soil. For these reasons, we counsel one or other of the following means of preparation:—

In the first place, after digging the muck—which may be done at any time when other work on the farm permits and the bog is sufficiently dry to be accessible to teams —it is well to pile it and allow it to so remain throughout the winter. The weathering —the action of the air and frost—serves to sweeten and disintegrate the muck, oxidizes any poisonous iron compounds that may be present, and thus prepares it for more ready decomposition in the compost heap. There are mucks so sweet and so well decomposed that they may with benefit be at once applied to the soil, but these are not of common occurrence.

### *Use as an Absorbent in and about the Farm Buildings.*

The air-dried and roughly powdered muck—and especially that from the upper layers of the bog composed chiefly of sphagnum and other mosses—is an excellent absorbent. Its use as such in and about the farm buildings, or wherever there is liquid manure likely to go to waste, cannot be too strongly recommended, for thereby not only is valuable plant food conserved (the liquid portion of the manure being by far the richer in fertilizing constituents), but the subsequent fermentation of the muck now intimately mixed with the manurial elements, rapidly brings about the conversion of its plant food into an assimilable condition. All mucks are not equally suitable for this purpose, but those of a peaty, mossy or powdery nature will be generally found of good absorbent capacity, and can be so employed. No special directions are necessary in this matter, but we may state that the practice of spreading a shovelful of the air-dried muck (which may be kept in a heap convenient to the building) in the gutter behind each cow after cleansing the stable, has been found to work excellently. It soaks up the liquid manure and makes the cleaning of the stable an easy task. The resulting manure, now largely increased in bulk and value, may be taken at once to the fields, or, still better, perhaps, submitted to a slight fermentation in the heap previous to use.

### *Muck Composts.*

The object of composting muck with various substances, such as manure, wood ashes, &c., is to start its further fermentation, and to liberate its plant food. It is obvious that those who have deposits of this naturally-occurring fertilizer convenient may at little cost largely increase their supply of manure, and restore to their land the humus and nitrogen which has been dissipated and used by continuous cropping.

*Composts with Manure.*—Spread on a level piece of ground a layer of the weathered and air-dried peat or muck, 6, 8, or 10 feet wide, and of any desired length, and 1 foot to 1½ feet in thickness. Cover with a layer of manure, say, 1 foot thick, and continue with alternate layers of muck and manure until the heap is 4 to 5 feet high, finally covering with a layer of muck. The proportions here given are to be considered as suggestions only, the principle involved being to use sufficient manure to set up active fermentation in the muck. Too large a proportion of the latter prevents the decomposition of the muck, which it is sought to bring about. Keep the heap moist, but at no time should it be saturated. An occasional watering in a dry season may be beneficial, and for this purpose liquid manure and house slops will be found valuable in assisting fermentation and enriching the compost. At the end of a few weeks—the period will largely depend on the season—the mass should be forked over and again covered with muck. This operation may be repeated at similar intervals two or three times. At the end of two, or possibly three, months the compost should be in excellent condition for application to the soil.

It will be obvious that any and all refuse on the farm of an organic nature, whether vegetable or animal, can be used advantageously for composting with these materials.

*Composts with Wood Ashes, Lime, &c.*—The growth of micro-organisms, which bring about the further fermentation of the muck, is retarded or altogether checked by the acid naturally present in the muck. On the other hand, a slightly alkaline condition favours fermentation, and it is, therefore, evident that wood ashes, lime or marl (alkaline substances) may be employed as composting materials.

*Wood Ashes.*—For every 100 bushels of muck add 10 to 15 bushels of wood ashes. Intimately mix by shovelling, and shape up into a compact heap, 3 to 5 feet high. If the muck is quite damp, no water need be added, but if it is dry, pour on a sufficiency to thoroughly moisten the mass. Finally cover with a few inches of muck, and leave the heap for, say, two months. It may then be reshovelled and again covered, moistening if necessary. Usually, from 4 to 6 months in summer time are required to bring the muck into a suitable condition for application to the soil.

Such a compost not only contains the plant food of the muck—now in more or less available condition—but also the potash, phosphoric acid, and lime of the wood ashes, and these greatly enhance its value as a fertilizer.

*Lime.*—Slake 10 bushels of quick-lime to a fine powder with brine made by dissolving 1 to 1½ bushels of salt in a sufficiency of water. This is then spread upon the muck in alternate layers, and the heap built up and treated as before described. For muck fresh from the swamp, use about 2 bushels of the lime to 100 bushels of the muck, for air-dried muck (to be subsequently moistened, if necessary), 10 bushels of lime to 100 bushels of the muck or peat.

Marl, gas-lime, and leached ashes may all be used for composting, using 20 to 25 bushels to the 100 bushels of muck.

### TOBACCO REFUSE.

Tobacco stalks, and the stems (from which the leaves have been stripped) dried and powdered, constitute a fertilizer of considerable value by reason of the nitrogen and potash they contain.

Tobacco dust or refuse from the cigar manufactory is largely made up of powdered stems or leaf ribs, and, if not too largely mixed with inert matter, such as sand, sweepings, &c., is well worth the attention of market gardeners, fruit growers, &c., in the neighbourhood of tobacco factories.

This material, we are informed, may frequently be obtained for the hauling, or at a nominal price. If, however, any considerable figure is asked it would be desirable to obtain some knowledge of its fertilizing value, as this may vary in different samples within very wide limits. A sample of the tobacco dust forwarded by Mr. L. S. Campbell, K.C., Montreal, and recently analysed by us, furnished the subjoined data:—

*Analysis of Tobacco Refuse.*

| | |
|---|---|
| Moisture | 7·45 |
| Organic matter | 63·09 |
| Ash or mineral matter soluble in acid | 8·69 |
| " " insoluble in acid | 20·77 |
| | 100·00 |

| | Per cent. | Pounds per ton. |
|---|---|---|
| Nitrogen | 1·27 | 25·4 |
| Potash | 1·36 | 27·2 |
| Phosphoric acid | ·34 | 6·8 |

As usually quoted by writers on agricultual chemistry, this material should contain from 1½ to 3 per cent nitrogen, and from 3 to 7 per cent potash. We suppose that in the sample here reported upon the lower values are due to the large amount of sand, &c., present. Nevertheless, it has distinct value, for at market prices of nitrogen and potash in equally available forms, it would be worth about $4 per ton for its plant food.

Though not, strictly speaking, a matter coming within the province of the Chemical Division to report upon, mention might be made here of the insecticidal properties of powdered tobacco leaves, stems, &c., used dry or in the form of a decoction or for fumigation. This material is largely used in the preparation of many insecticides now found upon the market and is especially advocated for the destruction of plant lice and other sucking insects.

### REFUSE FROM A POTATO STARCH FACTORY.

The results of our analysis of a sample of this by-product, forwarded from Charlottetown, P.E.I., and stated to be thoroughly representative of this material, are as follows:—

Analysis of Refuse from Potato Starch Factory.

| —— | As Received. | Calculated to Water-free basis. |
|---|---|---|
| Water | 72·47 | ........... |
| Organic matter | 23·41 | 85·04 |
| Ash or material matter | 4·12 | 14·96 |
| Total | 100·00 | 100·00 |
| Nitrogen | 0·183 | 0·782 |
| Phosphoric acid | 0·046 | 0·17 |

These data show that the fertilizing value of this material is insignificant, though it might prove of value to soils lacking in organic matter. The percentage of nitrogen does not exceed that in many soils of average productiveness, and in phosphoric acid this refuse is also decidedly low. It is evident, therefore, that this by-product could only be used locally with any hope of profit.

Undoubtedly, the best returns would be on light, sandy or gravelly soils, and used in conjunction with lime and marl.

## CHEMISTRY OF INSECTICIDES AND FUNGICIDES.

### KNO-BUG.*

So many inquiries regarding the nature and value of this newly introduced preparation have been received during the past season that its analysis was deemed desirable.

The packages sent in for examination were all of the same size and weight, holding 1 lb. of the powder. The printed matter upon the package states that it is a 'combined bug-killer and potato grower.' It further states 'Kno-bug is a preparation to destroy potato bugs and all other bugs that eat leaves, plants or vines. It not only destroy the bugs, but, unlike Paris green, acts as a vegetable tonic and stimulates the growth of the plant, prevents blight, scab and rots. Carpenter-Morton Co., Boston, Mass.'

It is a fine, earthy powder of a pinkish-red colour, but revealing under the microscope many particles of Paris green.

The analysis included a search for and determination of compounds that might act as insecticides, and also of those which would furnish plant food.

*Analysis.*

| | Per cent. |
|---|---|
| Paris green | 2·16 |
| Nitrogen (present as nitrates)† | ·729 |
| Potash (soluble in water)† | 2·44 |
| Phosphoric acid | traces only |
| Ground gypsum (land plaster) | 88·15 |
| Oxide of iron (ochre) | 3·67 |
| Insoluble rock matter | 1·32 |

This insecticidal compound, it will be seen, contains an amount of Paris green approximately equivalent to that in the 'dry mixture' recommended by entomologists for leaf-eating insects, and particularly for the potato bug. The formula on the spraying calendar of the Experimental Farm reads: '1 lb. of Paris green to be mixed with 50 lbs. of flour, land plaster, slaked lime or any other perfectly dry powder.' The vehicle, or filler, in Kno-bug being land plaster, shows that the manufacturers have in this case followed closely the teachings of those best qualified to advise in such matters.

There was no free arsenious acid present, or only mere traces, consequently this preparation could not injure foliage.

As regards plant food, analysis shows notable quantities of two important elements—nitrogen and potash—and these constituents are present as a compound which is soluble. They may, therefore, be considered as immediately available to growing plants.

The economy of using such compounds must depend largely upon their price, and in order to consider their value from this standpoint it would be necessary to know the prices at which the various ingredients could be bought. The latter are not necessarily the same for all purchasers. They depend upon the distance from large markets

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[*] In this name is evidently incorporated the formula of saltpetre or nitrate of potash $KNO_3$, one of the constituents of this preparation.

[†] Equivalent to 5½ lbs. (approximately) of potassium nitrate (saltpetre) per hundred weight of Kno-bug.

and the quantities in which the materials are purchased. On making a comparison, however, between the cost of the ingredients and of the prepared article, the probability is that there will be found a very handsome margin to cover the cost of mixing, putting up, &c., of the latter. Thus, for the purpose of illustration, we may assume the following prices: Paris green, 20 cents per lb.; nitrate of potash, 10 cents per lb.; and ground land plaster, 40 cents per 100 lbs. At these prices, the ingredients in 100 lbs. of Kno-bug would cost, approximately, $1.35. In other words, this preparation would be worth, for its several constituents that make it of value, either as an insecticide or fertilizer, about 1½ cents per lb. The retail price of Kno-bug is stated to be 10 cents per lb.

In the case of condimental foods for stock, the price almost invariably exceeds very largely the cost of the various constituents, and the same is no doubt true of preparations for the treatment and feeding of plants.

### BUG FINISH.

This is another preparation for the destruction of the potato bug. In its main features it is similar to the foregoing compound: that is, the base is gypsum, with a small quantity of Paris green as the insecticide. The essential elements of fertility, however, are absent. It is stated to be manufactured by 'Church's Alabastin Company, Paris, Ont.,' and to be retailed at 3 cents per lb.

In appearance, it is a grayish-white powder, showing under the microscope scattered particles of Paris green. On analysis we obtained the following data :—

*Analysis.*

| | Per cent. |
|---|---|
| Ground gypsum | 64·55 |
| Carbonate of lime | 7·14 |
| Oxide of iron and alumina | 2·30 |
| Insoluble rock matter | 17·51 |
| Paris green | 1·27 |

For those who prefer to use the 'dry powder' form of insecticide on potatoes, this compound no doubt will answer, though the percentage of Paris green is somewhat less than that recommended.

As regards the economy in using it compared with the home prepared powder, the remarks made in discussing Kno-bug are here equally applicable.

### OWENS' COMPOUND FOR THE PROTECTION OF TREES AGAINST INSECT AND FUNGUS RAVAGES.

This material, which has been exploited to a considerable extent in Western Ontario, was brought to our notice last March by several prominent orchardists, who requested an analysis and a report upon the claims of the promoter. These claims are that not only will it protect the tree against all insect and fungus ravages, but that the general health and vigour of the tree will be improved. The directions for use are simply to bore a hole in the trunk of the tree and insert the powder. Presumably, the 'powder' is to enter into the sap circulation and that this will be effective in rendering the tree immune against all insects and fungi.

We were able to obtain several samples of this compound, some of which had been taken out of trees previously treated. The first sample, obtained in the neighbourhood of London, Ont., furnished on analysis the following data :—

| | Per cent. |
|---|---|
| Sulphur | 94·3 |
| Charcoal (containing a little ash, &c.) | 5·7 |
| | 100·00 |

A second sample of this 'Owen mixture used in the tree plugging process,' received some six weeks later, and obtained from another correspondent, was found to contain the same constituents in almost the same proportions:—

| | Per cent. |
|---|---|
| Sulphur | 90·18 |
| Charcoal | 9·82 |
| | 100·00 |

The third sample, also from Western Ontario, afforded on analysis the following data:—

| | Per cent. |
|---|---|
| Sulphur | 93·65 |
| Charcoal | 6·35 |
| | 100·00 |

It is evident, therefore, that though little care is taken by the vendor in obtaining always the same proportions, we may be sure that the chief constituent is sulphur, to which has been added 5 per cent to 10 per cent of charcoal.

It seems scarcely necessary to point out that such a mixture could not be of the slightest value in protecting the tree against the ravages of insects and fungi, or in stimulating growth. It would be absolutely inert and inactive, remaining in the tree where it is put (as we had an opportunity of proving) and incapable of entering into the sap circulation.

It is extremely problematical if any chemical could thus to any extent be introduced into the sap circulation—and certainly such is out of the question with insoluble substances, such as sulphur and charcoal. Further, if such were possible, there is no doubt but that a quantity sufficient to deter insects and fungi from attacking the fruit and leaves would materially affect the health of the tree, and in all probability cause its death.

From time to time, such methods or processes as the one under consideration are exploited—indeed, it is quite an ancient fraud—and we presume a number of people, especially those who wish to save themselves the trouble of spraying, are induced to purchase and make a trial. Such methods are always of the same general character, and equally without merit. Quite recently an effort was made to sell county rights in Ontario for the Royal Insect Destroyer, promoted by a Mr. Lester, of Roanoke, Va., U.S., the plan of operation being identical with that of the so-called Owen Process. On inquiry from a reliable source, it was learnt that this compound was a mixture of gunpowder, sulphur, copperas, and saltpetre.

### FORMALIN,* FORMALDEHYDE.

This well known antiseptic, disinfectant and preservative is now extensively and most satisfactorily used in Manitoba and the North-west Territories for the treatment of seed grain for smut. It has been for this reason that we have undertaken the analysis of the more important brands of this material upon the market and now present the results. The following descriptions are copied from the labels on the bottles collected for analysis :—

No. 1.—Formalin, Chemische Fabrik auf Actien (Schering), Berlin.

---

* Formalin is the name copyrighted by Schering (Berlin) for a 40 per cent solution of formaldehyde. Merck, of Darmstadt, in the same way, for the same strength of solution uses the name Formol.

No. 2.—Solution Formaldehyde 40 per cent solution, Parke, Davis & Co., Walkerville, Ont.

No. 3.—Formaldehyde, 40 per cent solution, Lyman, Sons & Co., Montreal, Que.

No. 4.—Formaldehyde, Merck (Formol), Darmstadt.

These have been carefully analysed by the following four well known methods: The ammonia method, the cyanide method, the iodine method and the hydrogen peroxide method. All these, according to our experience are open to some objection, but the one in our judgment yielding the most reliable results is the last mentioned, and accordingly we shall only present the data from it:—

*Percentage of Formaldehyde (by weight).*

| | |
|---|---|
| No. 1 | 36·1 |
| No. 2 | 37·3 |
| No. 3 | 37·2 |
| No. 4 | 37·0 |

Nos. 2, 3 and 4 are practically identical. Our results go to show that great uniformity in strength prevails among the chief brands of this material for sale in Canada.

It is of interest to note that the data do not in any case show the presence of 40 per cent of formaldehyde, as advertised by the manufacturers. Upon consulting analyses by American chemists a similar result is to be generally seen, and we may, therefore, conclude that the strength of 40 per cent by weight is an approximation rather than a statement of an exact nature.

The specific gravity of the several solutions was taken with the following results:—

*Specific Gravity at 15·5° C.*

| | |
|---|---|
| No. 1 | 1·0815 |
| No. 2 | 1·0900 |
| No. 3 | 1·0895 |
| No. 4 | 1·0885 |

These are in accord with the determinations of formaldehyde above given, though somewhat at variance with those quoted in several standard works.

## THE CHEMISTRY OF BEE-KEEPING.

### THE STORAGE OF HONEY.

Our experiments towards ascertaining the best conditions under which honey should be stored, were begun in the season of 1902. These were with extracted honey, and the results showed that it seriously deteriorated if stored in any room with a moist atmosphere.

The experiment was conducted in December, a season when at Ottawa the air may be termed dry. The temperature of the laboratory in which the work was done, was from 65° F. to 70° F. In the subjoined table the term 'dry atmosphere' has reference to the atmosphere of the laboratory; the 'moist' or 'saturated' atmosphere was obtained by exposing water in a flat dish at room temperature, under a large bell jar. In this bell jar the honey, contained in a suitable vessel, was placed upon a scaffolding or frame-work.

*Experiments on the Storage of Extracted Honey, 1902.*

| | Water, per cent. |
|---|---|
| Ripe honey, from capped comb, at beginning of experiment.. | 15·88 |
| " exposed to dry atmostphere 1 month*........ | 14·24 |
| " exposed to moist atmosphere 1 month*...... | 31·46 |
| " exposed to dry atmosphere 20 days†........ | 13·84 |
| " exposed to moist atmosphere 20 days†........ | 48·23 |

*Exposed in glass cylinder. †Exposure in evaporating dish.

We notice that the honey kept in dry air lost somewhat in moisture-content. At the close of the exposure period this honey was in excellent condition.

On the contrary, that which had been kept in the moist atmosphere (under the bell jar) had absorbed large amounts of water. It had become thin and watery, and before the expiration of the exposure period had begun to ferment. In the tall cylinder, the percentage of water in the honey had doubled; in the open flat dish, with its large surface of honey (the same weight of honey was used in each), the absorption was much greater, the original amount of water being increased from 15·88 per cent to 48·23 per cent. This demonstrates very well the exceedingly hygroscopic character of honey and the desirability of keeping it in a dry atmosphere.

We have repeated this experiment during the past season with extracted honey, with a similar result, and also have had under trial honey in the comb. The latter is also shown to deteriorate rapidly in a moist atmosphere. The plan of the experiment was as follows:—

*Extracted Honey.*—This was weighed into flat-bottom, open dishes and exposed for three weeks (1) to the air of the laboratory, (2) in an atmosphere saturated with moisture (under a bell jar) in the laboratory, (3) to the air in a pantry of a house on the experimental farm, and (4) to the air in the cellar of the same house—this cellar being fairly dry and ventilated. The temperatures in (1), (2), and (3) varied from 60° F. to 70° F., and in (4) from 50° F. to 60° F., during the period of storage, October 12 to November 3.

*Comb Honey.*—A similar series of honey in the comb, i.e., section, were exposed, the temperatures being those already stated and the period of storage the same.

The results have been tabulated and set forth in the following charts:—

EXPERIMENTS IN STORAGE OF HONEY, 1903.

*Extracted Honey.*

From October 12 to November 3.

| Place of Exposure, &c. | Temperature. | Loss, (Water.) | Gain, (Water.) |
|---|---|---|---|
| | °F. | % | % |
| In laboratory (ordinary atmosphere) in open dishes............... | 60-70 | 2·79 | ........... |
| " (saturated " ) " ............... | 60-70 | ............ | 26·80 |
| In house (pantry) in open dishes................................ | 60-70 | 1·81 | ............ |
| " (cellar) " ................................ | 50-60 | ............ | 3·38 |

### *Honey in Comb (sections).*

From October 12 to November 3.

| Place of Exposure, &c. | Temperature. | Loss, (Water.) | Gain, (Water.) |
|---|---|---|---|
| | °F. | % | % |
| In laboratory (ordinary temperature) | 60-70 | 1·5<br>1·26 | ........... |
| " (saturated atmosphere) | 60-70 | ........... | 2·73<br>4·84 |
| In house (pantry) | 60-70 | 1·33<br>0·90 | ........... |
| " (cellar) | 50-60 | ........... | 1·13<br>0·76 |

Very little need be said in explanation of these results: their meaning is self-evident. The extracted honey exposed in the saturated atmosphere in the course of a few days showed marked signs of deterioration in quality, becoming thin and watery and beginning to ferment. At the end of the three weeks' period of experiment it was quite unsaleable, and indeed unfit for use as an article of diet. That which had been kept in the ordinary atmosphere (both in the laboratory and in the pantry) had not perceptibly altered in appearance or taste, and was in excellent condition. The cellar stored sample, at the end of three weeks, had begun to ferment.

While not suffering to the same degree as the extracted honey, that in the comb deteriorated considerably when placed in the cellar and still more so in the saturated atmosphere artificially provided in the laboratory. The latter before the close of the three weeks' period showed drops of water collected on the comb and had begun to mould. The comb stored in the pantry and in the laboratory at the end of the period of exposure was in first-class condition.

This investigation, therefore, covering two years' work, emphatically points to the desirability of storing honey—both comb and extracted—in a warm, dry atmosphere, such as may be obtained in an upstairs' pantry or room. Deterioration is sure to follow exposure in a damp atmosphere, and for this reason the cellar, no matter how dry it may appear, is not a good place in which to keep honey.

This work has been brought before the Ontario Bee-keepers' Association, and will be found in greater detail in the proceedings of that association for 1902 and 1903.

### BEESWAX.

In the report of this Division for 1890, there was published an account of the examination of certain samples of 'foundation comb' found to be seriously adulterated with paraffin. These, it was stated, although sold in Canada, had been imported from the United States. Since that date, until the present no complaint, so far as we know, has been made by Canadian beekeepers regarding the quality of the 'foundation' sold in this country.

In March, however, of this year, a request was made by the Goold, Shapley & Muir Co., Brantford, Ont., for an analysis of certain beeswax they had purchased from the United States for the manufacture of foundation, on the ground of suspected adulteration. In the interests of the Canadian honey industry, it was deemed desirable to accede to this request, and the examination was made. The results pointed to the presence of paraffin in all three samples, varying approximately from 25 per cent to 29 per cent.

Unlike the adulterated 'foundation' of 1890, these samples possessed a melting point practically identical with that of genuine beeswax, showing that the adulterant must be of the nature of ozokerite or cerasin—the former a naturally-occurring paraffin, and the latter its refined product.

We are informed that the firm in the United States on the receipt of our report made no demur to the return of the consignment, a decision at once acted upon by the Canadian manufacturers on learning from us that the wax was not genuine.

## WELL WATERS FROM FARM HOMESTEADS.

Of the 85 samples received during the past year, 55 have been submitted to analysis, the remainder, either from being forwarded in dirty bottles or being insufficient in quantity, were not submitted to examination. Though the larger number of these waters were, as usual, from Ontario, samples have been received from all parts of the Dominion. For the most part they are from farmer's wells, but the series also includes a certain small number of natural spring and river waters used by farmers.

In the table of analytical data a very brief statement is made as to the general character of the water from the standpoint of wholesomeness (see last column). A more extended account or consideration of the data would not here be possible, but in reporting to the senders a fuller opinion has been given, accompanied by advice as to the purification of the water or the abandonment of the supply, as the facts dictated.

Broadly classifying the results, we find that 20 of the waters were returned as seriously polluted and dangerous to use for drinking purposes, 18 were reported as suspicious or probably contaminated to such a degree as to render them unwholesome and unsafe, 5 were designated as saline and for this reason considered non-potable, and 12 were adjudged free from all pollution, safe and wholesome.

We have for a number of years past taken the opportunity annually afforded by the presentation of the results of these water analyses to utter a protest, or rather a warning, against the use of polluted waters. By far the greater number of wells examined are undoubtedly receiving excrementitious matter, either by soakage through the soil or by surface drainage. This polluting material comes from the barnyard, privy or some similar source. This means that such waters contain readily putrescible matter and most probably—most assuredly in the summer time—are teeming with bacterial life. Some of these bacteria or germs may be harmless and have little or no effect upon the health of those who drink the water. But if the germs of disease by any chance find an entrance—and this is by no means an uncommon occurrence—they find therein all that is necessary for their rapid development and the water at once becomes most dangerous. The only safeguard the farmer has in such cases is to boil all the water required for drinking purposes. No system of household filtration is so effective as boiling the water. The boiled water, on cooling in a vessel, exposed to the air, will lose its insipidity, and become pleasant and palatable. If there is any suspicion as to the quality of the well water, either from appearance or smell, there should be no neglect in taking this simple but most effective precaution.

But apart from the possible presence of disease germs, there is a danger in such contaminated waters that must not be overlooked, namely, from poisonous organic compounds derived from the partial decomposition of the infiltrating sewage material. It seems very probable that these are in many cases responsible for various disorders of the intestinal tract, diarrhœa, indigestion, as well as sick headache and general derangement of the system. If, therefore, it be established that the well is receiving polluting matter, in fact acting more or less as a cesspit, it should be abandoned, and at the earliest possible date.

The shallow well in the barnyard or close to possible sources of pollution is always a menace. At the very earliest possible opportunity a more distant and deeper source of supply should be sought and the old well abandoned. We do hope the day of the shallow well is passing away. The driven or bored well situated out of range of pollution from the farm buildings will, as a rule, furnish good water and an ample supply of it. With such a supply and a windmill pump the farmhouse and buildings can enjoy a water service at once wholesome, convenient and constant.

Farmers in doubt as to the purity of their well water may obtain an analysis and report of the same from the Chemical Division of the Central Experimental Farm, Ottawa. Directions for the collection of the sample (a matter of considerable importance) will be forwarded on application.

# ANALYSIS OF WELL WATERS, 1903.

RESULTS STATED IN PARTS PER MILLION.

| Number. | Locality. | Marks. | Date. | Free Ammonia. | Albuminoid Ammonia. | Nitrogen in Nitrates and Nitrites. | Chlorine. | Total Solids at 105° C. | Solids after Ignition. | Loss on Ignition. | Phosphates. | Report. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1902. | | | | | | | | | |
| 1 | Ottawa East, Ont. | J.B., No. 3 | Dec. 9. | ·04 | ·19 | 7·70 | 32·5 | 508·0 | 302·4 | 205·6 | None | Polluted, condemned as unsafe. |
| 2 | " | J.B., " 4 | " 9. | ·195 | ·38 | 9·45 | 75·0 | 509·2 | 286·8 | 222.4 | " | " " " |
| | | | 1903. | | | | | | | | | |
| 3 | Hazeldean, Ont | H. H. A | Jan. 22. | ·045 | ·11 | 11·67 | 32·0 | 314·4 | 191·2 | 123·2 | Traces | Seriously contaminated. |
| 4 | McAdam, N.B | D. T | Feb. 27. | ·134 | ·39 | ·38 | 12·50 | 156·0 | 85·6 | 70·4 | " | Suspicious. |
| 5 | Almonte, Ont | J. F | " 28. | ·05 | ·19 | 8·24 | 34·5 | 450·0 | 274·0 | 176·0 | " | Polluted. |
| 6 | Ottawa East, Ont | F. X. L | Mar. 2. | ·03 | ·205 | 6·82 | 147·5 | 911·2 | 482·4 | 428·8 | " | Undoubtedly contaminated. |
| 7 | Summerside, P. E. I | R. H | " 9. | ·44 | ·46 | 8.72 | 40·0 | 277·0 | 175·0 | 102·0 | H. ppte | Seriously contaminated. |
| 8 | Ottawa, Ont | T. G. B | " 9. | ·04 | ·127 | 10·37 | 10·3 | 549·6 | 346·8 | 202·8 | V. H. ppte. | Undoubtedly seriously polluted. |
| 9 | Beulah, Man | J. C., No. 1 | " 23. | ·016 | ·395 | ·003 | 28·0 | 3733·6 | 2756·0 | 977·6 | H. traces | Free from organic pollution, saline |
| 10 | " | " " 2 | " 23. | ·85 | ·765 | ·239 | 70·0 | 5134·8 | 4233·2 | 901·6 | Traces | Suspicious, saline. |
| 11 | Port Sydney, Ont | A. L. F. B | " 31. | ·01 | ·11 | 1·35 | 2·0 | 38·0 | 12·0 | 26·0 | None | Wholesome, unpolluted. |
| 12 | Kilaloe Station, Ont | J. W. P | Apr. 7. | ·89 | ·96 | 6·14 | 175·0 | 688·0 | 440·0 | 248·0 | Traces | Most seriously contaminated. |
| 13 | Nepean, Ont | W. D | " 14. | ·045 | ·16 | 14·26 | 24·0 | 426·4 | 234·4 | 192·0 | H. ppte | Very bad water, unsafe for use. |
| 14 | Almonte, Ont | L. C | " 20. | ·03 | ·11 | 3·36 | 3·0 | 267·2 | 196·0 | 71·2 | " | Very suspicious. |
| 15 | Yorkton, Assa | S. G., No. 1 | " 20. | 1·576 | ·28 | None | 122·5 | 2600·0 | 2115·0 | 485·0 | Traces | Suspicious, not suitable for drinking purposes. |
| 16 | " | " " 2 | " 20. | ·072 | ·41 | " | 15·0 | 712·0 | 458·0 | 254·0 | H. traces | Probably safe and wholesome. |
| 17 | Chilliwack, B.C | G. M. S | " 28. | ·02 | ·285 | 3·45 | 6·50 | 116·8 | 60·8 | 56·0 | V. S. Traces | Very suspicious. |
| 18 | Almonte, Ont | L. C | May 2. | ·028 | ·103 | 3·53 | 3·9 | 236·0 | 146·8 | 89·2 | H. Traces. | Polluted. |
| 19 | Ottawa East, Ont | J. B., S. Well | " 11. | ·044 | ·186 | 5·01 | 7·5 | 132·0 | 60·0 | 72·0 | " | Suspicious. |
| 20 | Hamiota, Man | A. E. K | " 12. | 2·79 | ·145 | None | 31·0 | 2071·6 | 1627·6 | 444·0 | Cons. traces. | Polluted, not suitable for drinking purposes. |
| 21 | Desbarats, Ont | S. G. F | " 21. | ·05 | ·21 | 1·42 | 16·0 | 310·4 | 208·8 | 101·6 | Traces | Very suspicions. |
| 22 | Stirling, Alta | C. B. R | June 1. | 1·59 | ·395 | ·076 | 49·5 | 2130·0 | 2082·0 | 48·0 | S. traces | Saline water. |
| 23 | Summerside, P. E. I | F. B | " 3. | Free | ·038 | 1·29 | 10·0 | 137·6 | 116·0 | 21·6 | V. S. traces. | Free from pollution, wholesome. |
| 24 | Almonte, Ont | L. C | " 3. | ·01 | ·095 | 2·174 | 4·5 | 296·0 | 229·6 | 66·4 | " " | Suspicious. |
| 25 | Mansewood, Ont | T. C., No. 1 | " 12. | ·01 | ·075 | 5·54 | 13·0 | 465·6 | 315·2 | 150·4 | S. traces | Polluted. |
| 26 | " | " " 2 | " 12. | ·11 | ·044 | 18·19 | 32·5 | 534·0 | 239·6 | 314·4 | " | " |
| 27 | Cutbank, Alta | F. G | " 23. | ·889 | ·72 | 3·797 | 180·0 | 2528·0 | 1922·0 | 606·0 | H. traces | Suspicious, not a good water. |
| 28 | Sheffield, N.B | F. B. J | July 4. | ·02 | ·08 | 10·5 | 40·0 | 216·4 | 124·0 | 92·4 | None | Polluted. |
| 29 | Meaford, Ont | J. L | " 18. | ·595 | ·115 | ........ | 58·5 | 3068·4 | 2358·8 | 709·6 | Traces | Seriously contaminated. |
| 30 | Hall's Glen, Ont | E. E. P | " 22. | Free | ·18 | ·453 | 160·0 | 840·8 | 586·4 | 254·4 | S. traces | " polluted. |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | Martintown, Ont....  .... | A. W. U., No. 1. | " 24. | ·01 | ·135 | 14·12 | 54·0 | 614·0 | 331·6 | 282·4 | Traces.. .... | Seriously polluted, dangerous for drinking. |
| 32 | " .... .... | " " 2. | " 24. | ·02 | ·08 | 3·21 | 4·5 | 316·4 | 194·4 | 122·0 | " ..... | Wholesome, unpolluted. |
| 33 | St. Agathe, Man.... .... | T. H........... | " 27. | 2·65 | ·305 | ....... | 4300·0 | 11508·0 | 8516·0 | 2992·0 | Free......... | Saline water. |
| 34 | Sussex, N. B............ | H. W. F....... | Aug. 4. | 3·99 | ·285 | 8·85 | 34·0 | 302·0 | 208·0 | 94·0 | S. traces.... | Seriously polluted. |
| 35 | Picton, Ont ............ | W. O. P........ | " 5. | ·117 | ·397 | None... | 9·0 | 393·0 | 258·0 | 135·0 | Traces.. .... | Probably contains drainage. |
| 36 | Hargrave, Man....... .. | W. B. P........ | " 7. | ·068 | ·405 | ·006 | 39·0 | 525·0 | 348·0 | 177·0 | H. traces.... | Not a first-class water. |
| 37 | Masonville, Ont.......... | A. H. C., No. 1. | " 12. | ·08 | ·265 | 12·87 | 31·0 | 645·2 | 330·8 | 314·4 | " ... | Unwholesome, polluted. |
| 38 | " ..... ..... | " " 2. | " 12. | Free.... | ·06 | 7·86 | 50·0 | 576·8 | 296·8 | 280·0 | S. traces.... | Suspicious. |
| 39 | Urquhart, Alta.......... | P. McD........ | " 13. | Free.... | ·265 | ·032 | 1·0 | 668·0 | 418·0 | 250·0 | Traces.. ... | Free from pollution, wholesome. |
| 40 | Vankleek Hill, Ont..... .. | K. McC........ | Sep. 5. | ·26 | ·19 | ·008 | 4·0 | 780·0 | 503·2 | 276·8 | " ..... | Suspicious. |
| 41 | Calgary, Alta..... .... | Mrs. J. A. T.... | " 10. | ·25 | ·29 | ·369 | 7·0 | 328·0 | 234·8 | 93·2 | " ..... | " |
| 42 | McAdam, N.B. ......... | J. W. H.... .. | " 11. | ·06 | ·12 | 2·85 | 7·3 | 120·0 | 74·4 | 45·6 | H. traces... | Possibly safe, but not a first-class water. |
| 43 | Guelph, Ont............. | W. H., No. 1.. | " 14. | ·06 | ·247 | ·756 | 5·8 | 262·8 | 146·4 | 116·4 | S. traces.... | From River Speed. |
| 44 | " ............ | " " 2.. | " 14. | ·08 | ·214 | ·763 | 6·7 | 261·6 | 148·8 | 112·8 | V. S. traces. | " " |
| 45 | Woodstock, Ont......... | W. G. F.. .. .. | " 21. | ·058 | ·21 | 16·14 | 80·0 | 839·2 | 572·0 | 267·2 | H. traces... | Suspicious. |
| 46 | Martintown, Ont......... | A. W. U. . . | Oct. 1. | None... | ·175 | 2·88 | 3·8 | 298·0 | 187·6 | 110·4 | V. S. traces. | Probably a good and safe water. |
| 47 | Brackenrig, Ont......... | T. W. K......... | " 5. | ·024 | ·124 | ·94 | None... | 42·4 | 23·2 | 19·2 | V. H. traces. | Wholesome. |
| 48 | Balsam Hill, Ont........ | C. L. McC...... | " 12. | ·66 | ·215 | ·058 | 20·0 | 360·0 | 238·4 | 121·6 | Traces.. .... | Unwholesome, suspicious. |
| 49 | Moosomin, Assa...... ... | J. H............ | " 17. | ·024 | 1·164 | ·158 | 175·0 | 11837·2 | 8538·8 | 3298·4 | None.. ..... | Saline water. |
| 50 | Ottawa East, Ont........ | J. B., (S. Well). | " 29. | Free.... | ·15 | 2·71 | 5·5 | 172·8 | 94·4 | 78·4 | S. traces.... | Shows a marked improvement on samples of May 11th. |
| 51 | Thamesford, Ont......... | W. J............ | " 31. | ·562 | ·252 | 4·12 | 24·5 | 411·0 | 256·0 | 188·0 | " .... | Very suspicious. |
| 52 | Newbury, Ont............ | G. A........... | Nov. 4. | ·16 | ·195 | 8·57 | 55·0 | 642·4 | 396·8 | 245·6 | Traces.. .. | Seriously polluted. |
| 53 | Grenfell, Assa........... | J. R............ | " 6. | 1·287 | ·315 | ·076 | 12·0 | 1572·0 | 1166·0 | 406·0 | S. traces.... | Suspicious. |
| 54 | Sault au Recollet, Que.... | R. P. J......... | " 16. | None... | ·10 | 5·259 | 4·75 | 250·0 | 134·5 | 115·5 | H. traces... | Wholesome. |
| 55 | Proctor, B. C.. .......... | J. W. F........ | " 26. | Free.... | ·102 | Free.... | Free.... | 188·0 | 126·0 | 62·0 | Free...... . | Exceptionally pure water. |

# REPORT

OF THE

# ENTOMOLOGIST AND BOTANIST

(JAMES FLETCHER, LL.D., F.L.S., F.R.S.C.)

## 1903.

OTTAWA, December 1, 1903.

Dr. WM. SAUNDERS,
Director of Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to hand you herewith a report on some of the more important subjects which have been brought officially under my notice during the past season.

The appreciation of the value of the investigations prosecuted by the officers of the Division is indicated by the large correspondence with farmers, fruit-growers and others in all parts of Canada. It is impossible in an annual report to deal with all the subjects which come up for consideration during the year. Many of these have already been treated of in previous reports, and the investigation of some is as yet in an incomplete state. Correspondents are constantly adding much to previously recorded facts concerning the habits of injurious insects, the utility of remedies, and the best way to apply them, the value of fodder crops, and many other subjects. The correspondence and replies relating to these are all carefully preserved and classified for future use. A complete index has been made of all letters which have been sent out from the division since the institution of the Experimental Farms up to the present time, which is of much use when working up afresh a subject which has been previously studied.

*Fodder Plants.*—The testing of grasses and other fodder plants, native and exotic, both in the experimental grass plots at the Central Experimental Farm and by correspondents, has been continued, and, as in the past, has been a source of much interest to all who have witnessed these experiments. The Awnless Brome Grass, the cultivation of which, from its introduction up to the present time, I have persistently endeavoured to encourage, has proved a great boon to farmers and stockmen in Manitoba and the North-west Territories. This grass is now recognized as one of the important staple crops of the West, where it is grown both for hay and pasture, as well as for the seed, which always meets with a ready sale. Attention has also been drawn to the value of various mixed crops for summer feed, and, following the experience of our Superintendents at the western farms, some farmers have grown with great satisfaction mixtures of pease, oats and wheat, one bushel of each to the acre; tares and oats, or pease and oats, one and a half bushels of each to the acre.

Lucerne or alfalfa has been tried to a certain extent in most of the provinces of the Dominion, and where care has been taken to prepare the land properly by ploughing deeply and then consolidating and smoothing the surface by harrowing, it has done well in many localities where it had been thought previously that this most valuable clover would not grow. It is also most important that the land should be in the condition known by farmers as 'good heart,' that is, fit to grow a good crop of an ordinary farm crop. I feel confident that this fodder plant, which is of such immense importance in the semi-arid districts of the western States, both on ordinary farm land and under irrigation, is worthy of a much more extensive trial in the North-west and Manitoba than up to the present it has received. This, to a large measure, is also the case with the other well known clovers so extensively cultivated in the East, but which are considered out of the question as farm crops on prairie farms. All of these clovers may be found in many places along railway banks throughout the West, and, where they have been tried on farms, although the general result has been considered a failure, still there are many plants persisting and in some places increasing slowly year by year. It is now well known that the satisfactory cultivation of clovers is much affected by the presence of bacteria-containing nodules upon the roots, and that, if these be present in the soil, the vigour of the plant is much increased. This increase takes place more and more every year when clovers are grown upon new soil, the original bacteria, adjusting themselves to the clovers from nodules on roots of native leguminous plants, or, possibly, being carried with the seed. White Clover is thoroughly established in the streets of Winnipeg and some other Manitoban towns, where it is sown to crowd out coarse weeds along the boulevards and in the streets. This plant grows well also at Regina, Calgary, and many other places. Mr. Bedford, the superintendent of the Manitoba Experimental Farm, writes:—'On this farm, when sown without a nurse crop, Alfalfa, Common Red, Mammoth Red, Alsike and White Dutch Clovers form robust plants by fall, and do not fail to pass the winter successfully. I sow in spring without a grain crop, because, when sown with grain, alfalfa and other clovers, but particularly alfalfa, have been winter-killed, the roots produced during the first year being small and short. I have grown alfalfa since 1887.'

When travelling through the North-west Territories, I have frequently come across farmers who have small patches of alfalfa, some of these of three or four years' standing. and Mr. T. N. Willing, of Regina, who, as Provincial Weed Inspector, has exceptional opportunities of seeing what crops are grown on farms in all parts of the North-west Territories, and who, as a practical farmer, is well able to judge the value of crops, writes:—'I am sorry to say I am not aware of any one who is conspicuously successful with alfalfa on a large scale, although many have tried small patches, which have apparently given most promising results. Mr. W. Stevens, of Cloverbar, near Edmonton, has a patch in its second season, which wintered perfectly; when mowed at the end of July it was between three and four feet high and gave a crop estimated at from three to three and a half tons. Near Battleford, the late Mr. Laurie sowed alfalfa about 1884; the season was dry, but the plants struggled on in spite of drought and gophers; the farm was subsequently abandoned, but in 1900, the alfalfa area was still clearly defined and proved attractive to the cattle. Mr. Laurie was satisfied that this would have done well, had he been able to care for it better. A man near Boscurvis has grown alfalfa for three years, and it has constantly improved. Near Prince Albert it was grown for five years by Mr. Acorn, but was then killed out by a late spring frost.'

In view of what I myself have seen in the North-west, and of statements made by farmers who have tried it upon small areas, I have thought it wise to recommend farmers in the West to test alfalfa more thoroughly, doing so on small areas and sowing in spring at the rate of from fifteen to twenty pounds to the acre, without any nurse crop and upon land which had been summer-fallowed the year before. The first year all that would be necessary, would be to mow the weeds. If, in districts where there is a little more moisture than is found on the open prairies, it was thought desirable to mix with the alfalfa or clover any grass, decidedly the best kinds for this purpose would be the Awnless Brome or the Western Rye-grass, which might be mixed in the proportion of ten pounds of alfalfa to six pounds of the grass seed. Awnless Brome does not as a rule make a very heavy growth the first season, and therefore it would not crowd out the somewhat delicate alfalfa seedlings, nor deprive them of too much soil moisture. The alfalfa, being a very deep-rooted plant, would be well suited for cultivation with either of these grasses, the root systems of which are much nearer the surface. I am glad to learn that the North-west government has secured from the Russian government a quantity of seed of the Turkestan variety of alfalfa, which will probably be distributed for testing in various localities next spring. This variety is merely a form of the common alfalfa which has been grown in Western Asia for a long time and has thus become accustomed to more severe conditions. I was fortunate enough to secure from the United States Bureau of Plant Industry some seed of the original distribution which was brought to America, and have a vigorous plot now growing from that seed. The two plants are almost indistinguishable, although the Turkestan variety is rather more vigorous in growth; but the leaves and flowers of both forms are similar.

*Collections.*—The collections of insects and plants in the Division have been very much augmented during the past year, many interesting additions having been made from material collected in the field, as well as through the kindness of correspondents who have sent in collections to be named by the officers of the Division. The success of the recent Nature Study movement in education has had a marked effect in increasing the interest in the subjects dealt with in the Division of Entomology and Botany, as has been evidenced by the large number of natural history objects which have been sent in with inquiries for information concerning them. These were for the most part insects and plants and came from teachers, students and farm children living in every province of the Dominion. I was much pleased to have the opportunity of distributing useful knowledge concerning these important subjects in this direct way to those for whom it was of so much practical value; and, moreover, from this source many valuable additions have been made to all of our collections. For several years material of all kinds has been accumulating from my own collections in the West, from the extensive breeding investigations into the life-histories of insects which have been carried on here, and from specimens sent in by correspondents for examination. During the past season many insects have been mounted and arranged in the cases, as well as plants in the herbarium, so that we have in the Division fairly good working collections which are now available for reference when required.

Insects.—The chief effort has been made to study and represent in the cabinets the various stages of those species which are injurious to crops, and those which are known to be beneficial. Much has also been done to build up the general scientific collections of the different natural orders of insects.

Plants.—Large additions have been made to the collection of native wild plants, and some hundreds of sheets have been mounted and arranged in the herbarium. These consisted chiefly of plants of various orders from the North-west Territories, from the Rocky Mountains, and from British Columbia. A good representation has also been secured of fodder plants, particularly of grasses. Agricultural weeds and poisonous plants, which are a subject of burning interest in the wheat lands of the West, and on the stock ranges, are well represented in our collections, and a recent improvement has been made by arranging the collection of seeds of weeds and other plants; this collection now contains seeds of about 450 species and includes nearly all of the weeds of importance in different parts of the Dominion. These samples have been of much service in identifying seeds found among seed grain and clover and grass seeds, sent in by farmers and seed merchants for examination as to purity and for testing as to vitality.

*Insects of the year.*—I am pleased to report that there have been no serious outbreaks of injurious insects during the season of 1903, nor have any new pests of importance made their appearance. One species of interest, but of no great economic importance is the Rhubarb Weevil (*Lixus concavus*, Say), which was found injuring rhubarb at Harrietsville, Ont. There was, however, been considerable loss in various parts of the Dominion from regularly occurring insect enemies; and, where farmers have applied promptly the remedies recommended, great saving has been effected. The season, on the whole, has not been quite as propitious as usual for good crops. Until the middle of June, the exceptional drought which prevailed through eastern Canada, prevented the germination of seed of all kinds, which retarded the development of many crops and exposed them to attacks from insect enemies. Later in the year, cool damp weather prevailed, which again delayed maturity and was the cause of some loss. Some of the leading features of insect presence during the year were the following:—

Among cereal crops there were no widespread or very serious losses. Hessian Fly was reported as the cause of some loss in Prince Edward Island, at one place in western Ontario and in restricted localities in Manitoba and the North-west Territories. The Wheat-stem Sawfly was abundant and destructive, although little observed, in south-western Manitoba. The Grain Aphis appeared suddenly during July and August in enormous numbers throughout Ontario, in Manitoba and in the North-west Territories and was the cause of considerable alarm; happily, however, the parasites which usually control this species, appeared soon afterwards and eventually, owing to the excellent weather for the grain to fill which prevailed last autumn, the injury was unimportant. In Manitoba locusts did some harm, but this was far less than in previous years. Farmers throughout the district, assisted by the provincial government, applied the standard remedy, the Criddle mixture, and in every instance with most satisfactory results. Experiments undertaken with a view to destroying these insects in a wholesale manner with the fungous disease which has been used in other parts of the world, were without avail, and this, I find, has been the general outcome of most experiments of this nature. Occasional successes which have been reported, seem to have been largely due to exceptionally advantageous atmospheric conditions at the time of the experiments. An outbreak which caused widespread alarm in Manitoba, was by the caterpillars of two broods of a common prairie moth, which this year appeared in vast numbers and, having consumed all of their natural food plant, the common weed known as Lamb's Quarters, ate many other plants, amongst which were some kinds of garden plants. This insect was the pyralid known as the Sugar-beet Web-worm (*Loxostege sticticalis*, Linn.).

Root crops and vegetables were diminished to a certain extent by the ordinary pests of the field and garden. Cutworms of various kinds were reported during the dry spring weather from all parts of the Dominion, and where not controlled did much damage. Root maggots, as usual, were irregular in their appearance, but in most places were the cause of great loss amongst onions, radishes, cabbages and turnips. The Colorado Potato Beetle was noticeably less abundant in most places. The Asparagus Beetle, a recent importation into Canada, although not a cause of much loss, has gradually extended its field of destructiveness, and last summer was reported as far east as Toronto.

Fruit crops generally have been good and remunerative, growers in all districts are seeing more and more the advantage of practising such common sense factors of success as spraying for the prevention of insect enemies and fungous diseases. The San Jose Scale has been held in check to a satisfactory extent wherever instructions of specialists have been followed, and although this insect has not spread beyond the limits of the previous year's infestation, the injury done and the future danger from its work are very great. The work of the Oyster-shell Bark-louse has been much complained of in New Brunswick, Nova Scotia and Ontario. The Pear-tree Flea-louse has been locally in Ontario the cause of considerable loss and has for the first time this year been recorded from Nova Scotia. The Pear-leaf Blister-mite is abundant in British Columbia and occurs now in every province of the Dominion. When trees have been sprayed just before the buds burst, with the lime, sulphur and salt wash, good results have followed. Plant-lice of various kinds were rather more abundant than usual on apple, plum and cherry trees, but were in most cases destroyed by parasites before much damage was done. The Tent Caterpillars, Cankerworms and the Codling Moth were noticeably less troublesome last season than for some years.

Shade-tree and forest insects were seldom referred to in correspondence, and few serious attacks were observed. In Montreal, Kingston and Toronto the White-spotted Tussock Moth has increased so much that remedial measures are now urgently needed or the beauty of shade trees in these cities will be much marred at no distant date. A remarkable outbreak of the Maple Soft Scale, *Pulvinaria innumerabilis,* Rathvon, took place on the street shade-trees last summer in London, Ont., causing much inconvenience to foot passengers, and the same insect also occurred on the shade-trees in Woodstock, Hamilton, and some other towns in western Ontario. The Negundo Plant-louse disfigured shade-trees to some extent in Winnipeg, Regina and Calgary, but not to a very serious extent. An insect which has gradually increased in abundance and now is destructive over a wide area in Canada, is the Spruce Gall-louse represented in the East by *Chermes abietis,* L., and in the West by *Chermes sibirica*, Cholodk. On small ornamental trees, spraying with a tobacco and soap wash has been effective, but in forests nothing can be done to check the ravages. There are, however, indications in some places that good work is being done by parasites. The unsightly nests of the Fall Webworm have become conspicuously more abundant lately than they have been for several years, and already demand attention from municipal authorities in towns, as well as from fruit-growers in many parts of Ontario and Quebec as also in British Columbia. The insect occurs right across the Dominion.

*Live Stock.*—The Cattle Horn Fly, which a few years ago caused such extensive losses to dairymen and stockmen in eastern Canada, has now reached the Pacific coast. Although still occurring in some numbers in the eastern provinces, its most severe attacks in 1903 were in British Columbia, where I found it last summer extremely abundant in some localities on Vancouver Island. Cattle-owners were not prepared to use the remedies which have proved to a large measure effective in the East ; but, when these were applied, relief was soon apparent. The most convenient remedy in our experience, is to smear the animals on the parts most attacked with a light dressing of pine tar, one pound mixed with five pounds of lard or half a gallon of fish oil.* Specimens of the fly were sent from Regina by Mr. Willing, which he had taken on horses; but I saw no annoyance either to cattle or horses during a long journey through several of the cattle districts of the North-west in June and July last. I am hopeful that it is hardly likely this insect will ever be a very serious pest of stock in the dry regions of the West, where the cattle droppings, in which only the fly propagates while these are in a semi-fluid condition, dry up so quickly that they are soon unsuitable for the larvæ to live in.

*Meetings.*—Whenever official duties would permit of my absence, no opportunity has been lost of meeting farmers and of attending meetings of farmers' institutes and agricultural associations of various kinds. The subjects treated of at these meetings were as stated below :—

December 26 to 29, 1902: Washington, D.C.—Association of Economic Entomologists: 'Can the Pea Weevil be Exterminated ?'; 'Injurious Insects of the Year in Canada.'

Through the kindness of the President of the Association, a special discussion was held on the former of these papers, and co-operation was promised by several of the entomologists at the United States experiment stations, in disseminating information and in applying remedies for the Pea Weevil in those States where pease are grown for seed.

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* This mixture contains twice as much pine tar as in former recommendations. We have found that it keeps off the flies much longer than the old mixture of 1 lb. in 10 lbs. of lard.

December 29, 1902: Washington, D.C.—Society for the Promotion of Agricultural Science: 'Co-operation in Fighting Insects.'

January 5, 1903.—A series of addresses on the Value of Nature Study in Schools was given at the school houses in the following places: January 5, Harmony, Cedardale and Oshawa. January 6, U. S. S. No. 4, Whitby; U. S. S. No. 5, Whitby and Kinsale. January 7, U. S. S. No. 1, Pickering; U. S. S. No. 4, East Pickering and Pickering Village. January 8, Pickering, Frenchman's Bay and Dunbarton. January 9, Audley, Brock Road and Cherrywood. January 10, a large meeting in the town hall at Whitby. At all of the above meetings I was accompanied by Mr. W. A. Dent, who delivered most interesting addresses upon the habits of birds. These meetings were organized to help the children of this district in competing for the prizes offered by the Live Stock Commissioner at the Whitby Model Fair.

February 18 : Toronto.—Canadian Association of Fairs and Exhibitions : 'The Value of School Children's Exhibits at Fairs.'

March 6 : Pembroke High School.—'The Value and Pleasure of Natural History Studies.'

March 16 : Toronto.—Canadian Institute : 'Rocky Mountain Plants and Insects.'

March 18 : Cowansville, Que.—(1) 'The Brome Corners Weed Exhibit and its Lessons'; (2) 'Fodder Plants Suitable to the Eastern Townships'; (3) 'Spraying to prevent Insect Injuries.'

March 21 : Toronto Teachers' Association.—'Nature Study, What is it ?'

April 3 : Renfrew.—'Why should boys and girls study Nature ?' A mass meeting held in the city hall. Renfrew Horticultural Society : 'What Everyone can do to Improve the town he lives in.'

May 11 : Hamilton Horticultural Society.—'Seasonable Hints on Insect Enemies.'

May 14 : St. Catharines district.—Examining orchards which had been treated with the McBain Carbolic Insecticide for the destruction of the San José Scale, in company with some members of the Ontario Fruit Growers' Association.

June 15 to August 21.—In the West, investigating an outbreak of locusts in Manitoba, and holding a series of farmers' meetings in the North-west Territories and in British Columbia.

September 3 and 4 : Ottawa.—Entomological Society of Ontario : 'Insects Injurious to Ontario Crops, 1903' ; (2) 'Entomological Record for 1903.' At this meeting a paper was also read by my assistant, Mr. Gibson, entitled 'Basswood, or Linden, Insects.'

September 16 : Whitby.—Attending the Central Ontario Model Fair and judging the natural history exhibits sent in by school children. Delivered an address in the evening at a public meeting upon 'The Children's Exhibits at the Fair.'

September 29 : Richmond.—Opening the Model Fair for Eastern Ontario. Address: 'Model Fairs and their Management.'

November 25 and 26: Leamington, Ont.—Ontario Fruit Growers' Association: (1) 'Insects Injurious to Fruit Trees and how to Fight them'; (2) 'Insects affecting House Plants.'

*Correspondence.*—The correspondence of the Division has been of the usual varied nature and as heretofore has taken up much of the time of the officers. Many of the letters written are practically articles upon special subjects which are suitable for publication in the press, and have frequently been made use of for this purpose, in that way reaching a larger number of interested readers than could be done by direct correspondence. From December 1, 1902, to December 1, 1903, the number of letters, exclusive of circulars, registered as received is 3,150, and the number despatched, 2,664.

*Acknowledgments.*—As in previous years, I take pleasure in gratefully acknowledging my obligation to many correspondents, to practical farmers who have much aided the work of the Division by promptly reporting outbreaks of injurious insects and noxious weeds, and for making, at request, special observations upon these. I must particularly mention in this connection, Prof. John Macoun, of Ottawa, who has on many occasions helped me with the identification of specimens, and also Dr. L. O. Howard, the U.S. Entomologist, Dr. Harrison G. Dyar, of the U.S. National Museum, and Mr. B. T. Galloway, of Washington. My thanks are also specially due to Dr. J. B. Smith, of New Brunswick, N.J., who has examined and named for me large numbers of Noctuidæ taken in Canada.

In conclusion, I take pleasure in again testifying to the excellent work done by my assistants, Mr. J. A. Guignard, B.A., and Mr. Arthur Gibson, to whose loyal and careful work much of the success of the work of the Division is due.

I have the honour to be, sir,

Your obedient servant,

JAMES FLETCHER,

*Entomologist and Botanist to the Dominion Experimental Farms.*

# DIVISION OF ENTOMOLOGY.

## CEREALS.

Weather conditions during 1903 in all parts of the Dominion have been somewhat unusual, and crops of all kinds, particularly cereals, have suffered somewhat from this cause. Crop reports from the eastern provinces record a prolonged spring drought with frosts in some places, which in Prince Edward Island and Nova Scotia somewhat thinned fruit crops and retarded growth of hay and pastures. A noticeable absence of injurious insects, with the one exception of cutworms, is mentioned by numerous correspondents in the maritime provinces. In Manitoba, conditions at sowing time were exceptionally favourable and all crops were got in and started well. The weather up to the middle of May was somewhat cool, and there was not much growth of grass and no trees were in leaf. After that time copious rains fell, which germinated all seed and gave promise of an enormous crop. The dry June which followed, with only light showers in July, checked the growth somewhat and, in districts where there was too little rain, grain was prematurely ripened. The result was that crops were rather lighter than usual, and in some districts both in Manitoba and the North-west Territories, where rain fell late in the season, crops did not ripen early enough to escape injury. The handsome gross yield, however, of fifty-seven million bushels of wheat, with an average of over 18 bushels to the acre, in conjunction with the higher price of wheat, gave the farmers of Manitoba and the North-west good returns for their work. In British Columbia Mr. J. R. Anderson reports that all grain crops were good and free of injury by insects. In Ontario the growing of wheat has decreased considerably during the last two or three years. This is doubtless due to losses from the Hessian Fly. In 1900, 1,068,000 acres were put in to fall wheat and 377,000 to spring wheat, while in 1903 only 665,000 acres of fall wheat were sown, with 248,500 of spring wheat. Prof. James, in his November crop report, for Ontario, says: 'The yield of fall wheat per acre is large and the quality of the grain is, as a rule, first class. Taking both yield and quality into consideration, the crop of 1903 may be considered as one of the best in the history of the province. There has been a greatly increased area of wheat sown this fall, more particularly in the Lake Erie district and other localities where the Hessian Fly did so much injury during the previous three or four years. The crop of spring wheat may be counted as above the average, although not so good relatively as fall wheat.' Oats, in all parts of the Dominion, were a heavy crop, but in some places were late in maturing and rather light in weight. No injury by insects, either to this cereal or to barley, was mentioned, and only very few references were made to rust, notwithstanding the heavy rains in some districts. The season of 1903 was not very favourable for corn. Seed planted early did best; that which was put in at the ordinary time, germinated very poorly from lack of rain and was consequently late. The long open autumn, before severe frost came, gave an opportunity for the crop to mature well, and most of it was saved in good condition, both for the bin and the silo.

Pease, which for several years have suffered so severely from the Pea Weevil, were grown to a much smaller extent in Ontario than for many years. In 1903 there were 125,500 acres less land sown to this crop in Ontario than in 1902; but the crop reaped was 1,259,971 bushels above that of 1902, with an average of 22 bushels per acre, against 14½ the previous year. This improvement, it must be acknowledged, is to some extent due to the campaign against the Pea Weevil, organized by the officials of the Ontario Department of Agriculture and this Division. Many farmers and others who grew pease, demanded from their seedsmen seed pease which had been treated to destroy any living weevils which might be contained in them, and the present satisfactory state of affairs emphasizes the importance of treating all seed before sowing it, and of insisting that all who sell pease should attend to this matter. If a little more effort is now put forth, I see no reason why the Pea Weevil should not be entirely wiped out in Ontario. The remedies which will, in my opinion, effect this, were given at length in my last report, and consist of sowing early, so as to hurry on maturity as soon as possible, reaping directly the crop is in a fit condition, threshing and fumigating with bisulphide of carbon at once and then bagging up the seed and keeping it in bags until required for use. If it is not considered convenient to fumigate the seed before sowing, all the weevils can be destroyed by sprinkling a little coal oil or turpentine over the seed and turning it well for two or three days before sowing, or the seed may be held over till the second year, when it will be quite free from weevils, because these always emerge at latest by the spring of the year following the season when they develop.

The GRAIN APHIS (*Nectarophora granaria*, Kirby=*Siphonophora avenæ*, Fab.).—The only insect which was complained of as having occurred in undue numbers on cereal crops during the past year was the well known Grain Aphis, or 'green fly.' There is no doubt that where this occurred early in the season some injury was done to growing wheat and oats, but for the most part, although the aphides were exceptionally abundant, the usual parasites accompanied them, and in a short time they entirely disappeared.

'Aweme, Man.—The Grain Aphis was extremely abundant on wheat and oats this year. They attracted our attention during the first week in July and later they were so plentiful that they wetted all the front part of the binder canvases, on which they could be gathered up in handfuls. Mr. Sutcliffe, of Treesbank, tells me that they were so abundant on his oats that they actually stopped the binder. On looking beneath the canvases, he found the rollers simply packed with smashed up plant-lice. These insects undoubtedly did considerable harm this year by sapping the vitality of the plants, thus preventing the heads from filling as well as they should have done. As usual, numerous parasites were present with these and the many other kinds of aphis which appeared on various plants this year. By the end of the season, the parasites had almost exterminated these.'—NORMAN CRIDDLE.

Samples and reports of the presence of the Grain Aphis were sent in from many places in Manitoba and eastern points in the North-west Territories, as well as from a few places much further west. It was reported as being unduly abundant in Manitoba, at Bagot, by Mr. Eli Roberts; at Portage la Prairie, by Mr. James Thompson, and at Miami, by Mr. Thos. Renwick, who spoke of it as general throughout that district. The farthest point west where injury was done was at Beaver Dale, N.W.T. (34.26.7 west of 2nd meridian), from which place specimens were sent by Mr. Geo. Fernie. At Ottawa large numbers of the Grain Aphis were found on wheat and oats at the end of July, and it was noticed in the experimental plots here that certain varieties of wheat were more attractive to the insect than others. As a general thing, the bearded varieties were found in this observation to be much less infested than bald wheats. In every instance, large numbers of parasites were found present with specimens sent in for examination. In our Ottawa fields these were represented by the following species of Hymenoptera: *Asaphes vulgaris*, Walk., *Lygocerus niger*, How., *Xystus* (Allotria) *tritici*, Fitch, *Aphidius avenæ*, Fitch, *Pachyneuron*, sp. There were also numerous specimens of the common coccinellids *Adalia bipunctata*, L., *Hippodamia convergens*, Guér., and the Thirteen-spotted Lady-bird Beetle (*Hippodamia 13-punctata*, L.), and of the Hovering Fly *Syrphus ribesii*, L.

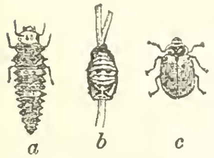

Fig. 1.—Lady-bird Beetle: *a*, larva; *b*, pupa; *c*, perfect insect.

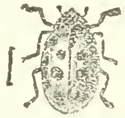
Fig. 2.—The 13-spotted Lady-bird Beetle—enlarged.

WHEAT-STEM SAWFLY *(Cephus pygmæus,* L.).—An insect which appears in a rather intermittent manner in Manitoba and the North-west Teritorries is the Wheat-stem Sawfly. Although present in considerable numbers in a locality one year, it seldom appears again in the same place the following year. It has from time to time been reported from Central Manitoba right across the plains to the Rocky Mountains. There are, I believe, other species of *Cephus* which attack various grasses in the West. In 1902, Mr. Norman Criddle sent me from Aweme, Man., a large number of stems of two grasses, *Ammophila longifolia* and *Agropyrum caninum,* which were attacked by Cyphid larvæ. Judging from the colour—one was bright yellow and the other white like the Wheat-stem Sawfly—there were at any rate two species; but, unfortunately, I failed to rear any of the flies from the large amount of material sent me by Mr. Criddle. During the past season I received several infested wheat straws from Mr. John Davis, of Waskada, Man., who wrote :—

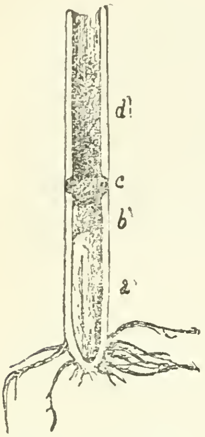

Fig. 3.—Wheat-stem Sawfly: *a*, cocoon, *b*, borings.

> August 19.—I am sending you a few stems of wheat which I and many others here would like you to report upon. You will notice that some of the straws are broken or bent down three or four inches from the ground. The cavity of the straw is full of fine dust, and there is a small white grub about half an inch in length. This I have generally found low down quite near the root. It is very general through this district, but is not very destructive. The straws fall as they get dry, and where the attack is slight it might easily pass unnoticed. I have one field of 45 acres summer-fallowed last year. We were estimmating this to yield 30 bushels to the acre. There is about 5 per cent of this field down. I have not seen any other field so badly attacked as this is, but I have not seen any field about here that is quite clear of injury. It is a new pest here, and no one seems to know anything about it.'

This insect has provisionally been named *Cephus pygmæus,* L., and it certainly bears a close resemblance to that European species; but there are some points in its habits and life-history which do not agree, and it is just possible that the insect which occurs in our North-west may be a native grass-feeding species which occasionally attacks wheat when it finds that plant in a suitable condition at the time the females are laying their eggs. This can only be proved by carefully rearing a large series of the insects. The perfect insect is a shining black four-winged sawfly, banded and spotted with yellow, and having the abdomen slightly compressed. The head is large, with prominent eyes, the antennæ slightly club-shaped and composed of about 20 segments. The female is rather larger than the male and less ornamented with yellow. The average length of this fly is about one-third of an inch. The eggs are laid probably about the 1st of July, just before the wheat comes into head. They are inserted into the hollow of the stem by means of the female's saw-like ovipositor. The egg hatches in a few days, and the larva grows rapidly; before the straw ripens and hardens it will have eaten its way from the topmost joint of the stem to the lowest, feeding on the substance of the knots and on the inside tissues of the straw. About the time the grain ripens, it goes down to the lowest joint and gnaws away the inside of the straw so as to cut a ring almost, but not quite, through to the outside. This is just above or at the surface of the ground. The larva then burrows further down into the base of the stem and spins a very fragile skin-like cocoon, in which it remains unchanged until the following spring. The date of appearance of the perfect insect varies with the season and locality. I have taken specimens by sweeping, both in grain fields and on the prairie, from the last week of June to the middle of July. As all the larvæ pass the winter in the base of the straw, remedial measures must aim at treating the stubble so as to destroy them or the pupæ before the flies emerge. I have suggested that this may be done either by ploughing deeply or by burning over the stubbles. As a few of the cocoons occur high enough up in the straw to be cut with the grain, all straw which cannot be used during the winter should be burnt.

The HESSIAN FLY (*Cecidomyia destructor*, Say).—This destructive insect, which a few years ago was the cause of such extensive loss in the fall wheat-growing districts of Ontario, was hardly noticed during the past season. Prof. Lochhead, of the Ontario Agricultural College, writes: 'This pest of wheat, barley and rye is no longer a serious enemy in the province. It has only been observed in one or two localities during the past season. In the vicinity of Georgetown it did much damage in wheat grown on stubble. A correspondent writes: "In good crops very little harm was done. On one occasion, in passing along the road, I noticed in a badly injured field that there was one very luxuriant patch of grain. I examined this patch, where evidently a pile of manure had lain, and found that the straw and grain were in good condition. I could not find a single stalk infested by the Hessian Fly." Most farmers are practising late sowing, that is about September 15. This probably had a good deal to do with the disappearance of the Fly.'

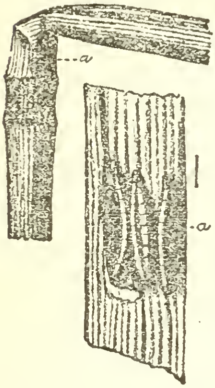

Fig. 4.—Hessian Fly: injured wheat-stem; 3 puparia—enlarged.

Reports from Prince Edward Island show that the Hessian Fly was noticeably present in several localities, and Mr. E. J. McMillan informs me that there was a considerable amount of loss in some places. In the West, Hessian Fly was mentioned quite frequently in correspondence from Manitoba and the Territories, but I believe that there was a confusion, in some instances at any rate, with the work of the Wheat-stem Sawfly. The only account of a serious outbreak was from Beulah, Man., where Mr. A. J. Dennis reports that 'the Hessian Fly has been much thicker this summer than I ever saw it.'

On the whole, however, there was probably not quite so much injury in Manitoba this year from Hessian Fly attack as in 1902. As has been frequently stated, there is normally only one annual brood of the Hessian Fly in Manitoba; consequently, the remedy is comparatively simple as compared with Ontario and the eastern provinces, where the insect is carried over in fall wheat. When Hessian Fly is known to be present in a district the grain should be cut high and the stubble burned over or ploughed down in autumn, and straw should be fed or burnt before the time the flies emerge the following spring. Screenings and rubbish from threshing machines should be put where poultry can get at them or where they will be trampled into the ground during the winter by stock.

## LOCUSTS.

Locusts, or grasshoppers, which have been the cause of much anxiety in Manitoba during the past three years, again appeared last spring in the same localities as previously. They were so abundant that the provincial Minister of Agriculture again thought it wise to help farmers with advice and to supply Paris green for poisoning them with. Mr. Hugh McKellar, the energetic Chief Clerk of the Department of Agriculture, by instruction of his Minister, visited the infested districts and made arrangements for the distribution of poison. This was taken advantage of by many farmers, who used the Criddle Mixture with great satis-

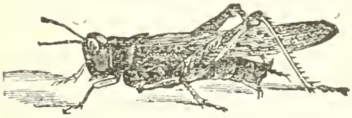
Fig. 5.—The Rocky Mountain Locust.

faction. Some farmers who had read in the newspapers of experiments in treating grasshopper outbreaks with parasitic fungi, asked that some experiments of this nature might also be tried in Manitoba. The idea of treating outbreaks of injurious insects by means of introducing parasitic insects or fungi is an exceedingly attractive one, and, to those who have never studied these matters, is apparently a very easy solution of a difficult problem. Knowing that many of our leading American entomologists and botanists had made extensive experiments in this direction, but that nothing was being done by these students at the present time, I had not any very sanguine hopes of securing great success in Manitoba; but, as there certainly was a chance of doing good work for the province, I endeavoured to procure some cultures of the so-called South African Grasshopper Fungus for this purpose. After correspondence with many who had experimented, I at last succeeded, through the kindness of Dr. Howard, the United States Entomologist, in obtaining six tubes. These I took with me to Manitoba in June last and placed them in the hands of Mr. Norman Criddle, a careful experimenter and asked him to follow closely the instructions which accompanied them. This work was begun while I was with him and carried out by Mr. Criddle during the summer. Notwithstanding every care, this experiment must be recorded as a failure. I append herewith Mr. Criddle's report upon his work with locusts during the season of 1903.

## *LOCUST NOTES FROM AWEME, MAN., 1903.*

By Norman Criddle.

There has been throughout this part of the country a marked decrease in the number of locusts during 1903, especially where they were poisoned last season. All the early damage done, which amounted to very little, was owing to many of the stubble fields being last spring devoid of all vegetation, and consequently locusts were obliged to attack the grain much earlier than they otherwise would have done. The first hoppers noticed hatched out on the 3rd May; they were becoming quite numerous by the 5th, and on the 12th the majority were out. They then began to do harm. By the 15th they had swept into some fields in millions, I think, thicker than I had ever seen them before. They had in three days marched 200 yards. Up to this time a small amount of damage was done; but this was principally owing to carelessness, and the insects were soon got under control with poison. By the 5th June most of the locusts had passed the third stage and, owing to the hot weather, it required a good deal of exertion to keep them from the growing grain. Wherever poison had been spread, countless numbers were found lying dead about the edges of the fields. At this period quite a number hatched in the wheat fields, the eggs having evidently been laid on summer-fallow last year. On June 13 most of the locusts were in the fifth stage, and the first one was noted with wings. By July 2 two-thirds could fly and some of them began migrating. By July 6 they could nearly all fly, and many of them flew into the crops. It is at this time that the second stage of the fight begins; the locusts, flying to all parts of the crop, eat the heads of grain. Fortunately, they soon collect into the sunny places, such as where the seeder has missed or any other open spot, so that, by walking up and down the fields, these places can be found and poison spread there. In fact, I am inclined to believe that in localities where locusts are troublesome it would be a good plan to miss a foot or so when drilling for the insects to collect upon. The migrating season was over by July 15, the weather at that time being cold and unfavourable for flying, so that very few left the neighbourhood. On August 1 the first female was noted laying eggs, although egg-laying did not become general until the 11th of that month, from which date eggs were deposited continuously until all these insects had disappeared. This they began to do about September 1, gradually getting less, until by October 3 they had nearly all disappeared. A few remained until the winter set in. The locusts responsible for damage this year were the same as last, and in the same proportion.

These were the Lesser Migratory Locust *(Melanoplus atlanis,* Riley), Packard's Locust *(M. Packardii,* Scudd.), the Two-lined Locust *(M. bivittatus.* Say), and the Rocky Mountain Locust (*M. spretus,* Uhler).

There is no doubt that the cause of the decrease in locusts was largely due to the co-operative work of farmers with Paris green, added to the increase of two species of Blister beetles, *Epicauta sericans,* Lec., and *Epicauta pennsylvanica,* DeG. This year the first of these insects were seen on June 1, and by the 4th of that month they had become abundant. *E. sericans* occurred on the dry prairies and *pennsylvanica* in somewhat damper spots, wherever the Wild Pea *(Lathyrus venosus.* Muhl.) is plentiful. *E. pennsylvanica* did considerable damage to potatoes and broad beans, but *E. sericans* is in no way injurious; it is, on the contrary, beneficial, as it seems to confine itself almost entirely to lamb's-quarters, though I have seen them actually eating wheat when other food was not to be found. The native food plant appears to be the Crocus Anemone, *Anemone Nuttalliana,* Gr., which I have often seen them eating. These beetles had all disappeared by August 28. That these two species of insects will be the cause of a still greater decrease of locusts next season is, I think, little to be doubted; for, although there are still numerous fertile eggs in some places, and notwithstanding that many locusts remained alive late into the season and there were an enormous number of eggs deposited, still, from observations I have made, I find that at least two-thirds of the eggs have been destroyed by Blister beetles. Of 141 pods examined, the eggs of 97 were destroyed. Of other locust parasites, there was an increase of tachina flies, and the Locust Mite seems to be rather more plentiful than usual. Another friend was Franklin's Gull, *Larus Franklinii.* During the migratory season, between July 26 and 31, thousands of these birds were to be seen flying up and down the fields, particularly on the summer-fallows, busily engaged in picking up locusts. Unfortunately, they were too late to prevent many of the females from laying eggs, although, of course, they did an immense amount of good.

Some damage was caused from locusts eating binder twine; very few had bluestoned the twine, and we have now been able to demonstrate without a doubt that some brands of binder twine are much more subject to attack than others. Whether it is that certain brands are made of different material or that they are looser than others, I cannot say; but the twine which was most attacked is very loosely twisted.

With regard to what you have called the Criddle Mixture, numerous tests were made with Paris green during the season to ascertain as accurately as possible the strength required to kill locusts, and it was found that one pound of Paris green could be mixed with five patent pails of horse droppings with absolute success. Weaker mixtures were not quite so successful. In the past, I believe, a large amount of Paris green, as well as labour, has been wasted through putting out the mixture in cold or wet weather, whereas I find that practically no feeding takes place in the spring with a temperature below 50°F. It is on the hottest days that locusts eat most, and consequently are most easily poisoned. In the early stages locusts much prefer the mixture moist, and I have found that spreading a little every other day, in the morning, gives much better results than scattering a lot at a time, and less frequently. Another advantage of spreading lightly is that the danger of cattle eating it is greatly lessened, whereas when put in lumps the danger is claimed to be considerable.

I regret to say that some cases of cattle poisoning were brought to my notice during the season. Though in every case the loss was the result of either ignorance or gross carelessness, in some cases, through spreading the mixture in too large lumps, or even putting it in pasture fields, or through leaving the barrel or whatever it was mixed in, where cattle could get at it. As I have said more than once, if the mixture is only scattered properly, there will be practically no danger. A good preventive measure is to keep cattle well salted. As Mr. McKellar remarked, 'Some farmers are overgenerous with salting their grasshopers, but neglect their cattle. This is a fact.

*Locust fungus.*—I am sorry to say that the tubes of the fungous locust disease left in my care, proved a complete failure. One failed to show any signs of growth, but the others were perfectly fertile. The first culture was mixed in sugar and water and was left in a warm place, as directed, until it showed signs of growth, when it was put out as follows: (1) Scattered among the grass infested by locusts ; (2) locusts were caught and dipped in it ; (3) it was put on pieces of horse droppings, bran and other attractive food, the weather at the time being very dry. Locusts after being dipped in the culture were kept in a large box for some days, but showed no signs of being any the worse for their treatment. The second culture was put out on the evening of July 22, during damp and rainy weather, though rather cold. It was spread among the locusts in the same way as the first. Two locusts were found dead, possibly as a result of this, three days after it had been put out.

The third lot of fungus was put out on July 15, in the evening when considerable dew had fallen. No results were observed. Another lot was put out on the 16th. This was mixed in bread crumbs, some of which was eaten by locusts; but no dead insects were found. During the time several locusts were found which had been killed by the native fungous disease in spots widely removed from one another and at long distances from where the experiments were being conducted, showing that the weather conditions were at least fairly favourable for this work, and also that this disease is probably always present and makes its appearance as soon as the conditions are favourable. The last lot of fungus was put out on August 2 in the same way as the first. No results were noticed.—NORMAN CRIDDLE.

Referring to the above statement that cattle have been poisoned by the Criddle mixture, it need hardly be pointed out that, with this remedy as with every other in which an active poison is used, at any rate ordinary and reasonable precautions must be taken to prevent stock of all kinds from eating the material. It is well known that horned stock will, if allowed to do so, eat the bedding from a horse stable, but this can hardly be recommended as a good food for the production of milk, and the practice should be prevented. If the Criddle mixture is distributed in the manner recommended, that is, for the material to be scattered loosely through the plants at the edge of a field of standing grain, it can hardly be said that there is any danger. One instance came to my knowledge of a man in Manitoba who had mixed half a barrel of the Criddle mixture, part of which he did not use. The half barrel containing this was put in his barn and left there till threshing time, when, to make room, it was turned out into his yard where he had some cows. Some of these ate the poisoned material and died from its effects, but this instance of carelessness can hardly be cited as a reason for not using this most useful remedy against grasshoppers. If it is, it means that the use of active poisons such as Paris green and many other compounds now thought to be necessary to the fruit-grower and farmer, and the whole operation of spraying, would have to be condemned. On occasions when farmers have been using the Criddle mixture, which is in every way the cheapest effective remedy for grasshoppers which I have ever tried, if there is any of the material left over, it should be scattered loosely over a piece of land where its fertilizing effects may be secured and where there will be no danger of poisoning animals.

The only other place in Canada where grasshoppers were noticed in numbers was in the Okanagan valley of British Columbia. Mr. E. P. Venables, of Vernon, writes : 'Grasshoppers were numerous at some places, and, although no appreciable damage was done, some people are anxious lest there may be a repetition of the plague of three years ago. Some of their enemies, however, were in evidence to an equal extent with the grasshoppers. Among these, the Spotted Gray Blister-beetle *(Epicauta maculata, Say)* was very abundant, feeding upon wild plants. Therefore, it is to be hoped that their larvæ will help, if they keep up their good name for destroying the eggs of grasshoppers.'

The Criddle mixture, as modified in accordance with the latest experiments, consists of one part of Paris green, mixed thoroughly in 100 of fresh horse droppings, to which two pounds of salt per half barrel of mixture have been added, after being dissolved in water. This is placed in a half barrel and drawn on a cart to the edge of an infested field or one likely to be infested. The mixture is then scattered broadcast along the edge of the crop by means of a trowel or wooden paddle. The locusts are attracted to it from long distances and are killed in large numbers by eating the poison.

## FIELD CROPS.

The Clover Seed-midge *(Cecidomyia leguminicola,* Lintner) has been the cause of very serious loss to seed growers in all parts of Ontario where clover seed is produced. Probably one-half of the crop was destroyed by this insect. In some districts the whole crop was completely ruined. The remedy of feeding off or mowing the first crop of clover before June 20 has been found satisfactory by all who have tried it. The reason of this is that the maggots of the first brood come to maturity towards the end of June, and then leave the clover heads to enter the ground, where they complete their changes; and if the clover is cut or fed off before that date, the immature larvæ are destroyed. If the clover is left standing later than June 20, the maggots will have time to complete their growth and leave the clover heads. From these larvæ the second brood which attacks the seed of the second crop is produced. Just about the time the seed is ripe, the larvæ of the second brood fall to the ground and burrow beneath the surface, where they pass the winter, the flies emerging in June of the following year and laying their eggs in the flower heads soon after these form.

The Hop Aphis *(Phorodon humuli,* Schrank).—It is many years since serious complaint has been received at the Division of excessive injury by the Hop Aphis. In the extensive hop fields of British Columbia there is an occasional outbreak, but the excellent crops of the last few years and the high price which has been secured for British Columbian hops, shows that this crop has been produced to great perfection and without serious injury from insects. In some of the plantations in the valley of the Fraser it has required constant attention on the part of growers to keep the 'Red Spider' under control; but this has been done to a reasonable extent. The sovereign remedy for all mites, of which the so-called Red Spider is one, is sulphur in some form, either as flowers of sulphur mixed in the ordinary quassia and tobacco wash, which is pretty generally used as a remedy or a preventive of Hop Aphis, or distributed as powder through the plants. A new pest which has appeared in sufficient numbers this year to be noticed in British Columbia is *Psylliodes punctulata,* Mels., a small flea-beetle which was sent in by Mr. H. Hulbert, of Sardis, B.C., under the name of the Hop Flea-beetle. This has been referred to briefly as a hop pest in Bulletin No. 4, old series, of the United States Division of Entomology.

Some years ago hops were grown to a large extent in Prince Edward County, Ontario ; but of late years the industry has been to some measure given up for the cultivation of other crops. Some growers, however, have continued to grow hops, and quite recently others were resuming the practice. During the summer of 1903, which, as has been stated already, was particularly characterized by the abundance of many kinds of plant-lice, the hop yards of Ontario have suffered from a serious visitation of the old-time enemy, the Hop Aphis. Through the kindness of Mr. John D. Evans, of Trenton, I have received a great deal of information concerning this outbreak, and he has been good enough to visit and interview several of the growers who were most interested in this subject. I have also received from Mr. W. B. Cooper, of Bloomfield, Ont., who has been for many years an extensive grower of hops, a detailed account of this outbreak. Mr. Evans writes:

'Trenton, Nov. 23.—Mr. H. S. Miller, of Picton, who is a large dealer in hops, and who visited many of the hop yards at different times during the past season, states that the total hop crop in the district this year yielded only 46 tons; last year, with the same acreage, it was 128 or 130 tons, and that at least two-thirds of the hop acreage this year was afflicted with the pest. Although the loss was severe in some places, it was not general throughout the district; for instance, Mr. Branscombe, of Chisholm, only got two bales from three acres, his crop being almost a total failure. He stated that the insects appeared first of all as plant-lice when the hops were coming into burr. After that it seemed as if a blight had struck them; the vines which were affected produced no hops, and the leaves turned black. On a knoll in his yard the vines were heavy and produced the two bales referred to. Then, on the other hand, Mr. Philip Vanmeer, of Bethel, Ont., had 22 acres of hops. The centre of his yard was on high ground, but the land sloped off in all directions to low ground. His yard was not affected, and he did nothing in the way of spraying or otherwise, in the way of special treatment, except that the yard was kept thoroughly cultivated. He had a very heavy crop. It would appear, then, that the abundance of this insect is not affected by the land being high or low. A great many ladybird beetles were present among the aphides. There was a similar visitation by the Hop Aphis in 1886, when the hop crop was almost ruined; but since that time the insect has occurred only in very limited numbers and has not been noticed. None, or very few, of the growers here have done any spraying, as they have not the special apparatus which is necessary. I am told that the spraying pumps which answer for fruit trees will not for hops.'

Mr. Henry Corby, of Belleville, Ont., as far as I can learn, was the only grower who sprayed his yards in a thorough way to protect them from injury by the Hop Aphis last year. His experience, however, has been so widely commented upon by hop growers in the vicinity and in Prince Edward county that I have no doubt the wise measures adopted by Mr. Corby will have the good effect of inducing others to spray their yards next year, should there be any appearance of the Hop Aphis. Mr. Corby writes:

'Belleville, Nov. 19.—Your favour in *re* Hop Plant-louse received. In reply we first noticed the Hop Plant-louse on the vines about the 1st July. From the 1st to the 10th they came on very thickly indeed. As I had eighty acres under cultivation, we continued the spraying for close on to a month. The mixture I used, was 7 pounds of whale-oil soap and 8 pounds of quassia chips, boiled for an hour. This made 100 gallons of wash. I used an English sprayer which takes two horses to draw it, but it does thorough work. I consider that I lost one-quarter of my crop at least; but, had I not used the sprayer, I doubt if I should have had any hops at all. The quality of my hops is first-class.'

The life history of the Hop Aphis is a remarkable one and is given in a condensed form in my annual report for 1889, which I repeat herewith, as the life history has an important application in this species, to the remedies which are suggested. The life history of the Hop Aphis has been carefully worked out by Prof. Riley and recorded in his report for 1888 as follows : 'Of this species the winter eggs are laid by the perfect females upon plum trees in autumn. From these hatch, the following spring, wingless females which are called "stem-mothers." These produce young plant-lice by a process analagous to budding in plants and known as parthenogenesis (from the Greek *parthenos,* a virgin, and *genesis,* production), which means the production of young from imperfect and unimpregnated females, without the intervention of a male. There are three broods of these parthenogenetic females produced on various kinds of plum trees, the third becoming winged. This last is known as a migrant and it instinctively flies to the hop plant, which up to this time has been free from attack. A number of generations of wingless females are produced upon the hop until, in autumn, winged females known as the return migrants again apear. These return to the plum and produce some three or more young which have no wings but are true sexual females. Somewhat later than this, upon the hop vines true winged males, the only males of the whole series, are developed. These fly to the plum trees and towards the end of the season may be found pairing with the wingless females, which afterwards stock the tree with eggs which pass the winter there.'

The above life history will show how complex and difficult to understand are the habits of some of our injurious insects. The importance of this knowledge, however, cannot be over-estimated ; for it is plain that, if the Hop Plant-louse passes the winter in the egg form upon plum trees, by having no plum trees near the hop yard, the opportunities for the insect to increase in a certain district are much reduced, and, further, that, if plum trees near hop yards are treated during the winter to destroy the eggs, a very large proportion of the infestation can be wiped out. It has frequently been noticed by farmers and others with what enormous rapidity the different kinds of plant-lice sometimes increase. Dr. Wm. Saunders, in the annual report of the Entomological Society of Ontario for 1878, refers to this matter as follows:—

'Some idea may be formed of the numbers to which in a short time plant-lice increase, from a calculation of Curtis, the celebrated English entomologist, who computed that from one egg only there would be produced in seven generations, taking thirty as the average of each brood, the enormous number of 729,000,000, so that, were they all permitted to live, everything on the face of the earth would in a short time be covered with them. Indeed, sometimes the possible rate of increase is even greater than this. Dr. Fitch, the state entomologist of New York, ascertained by actual experiment, that the wingless females of the Grain Aphis became mothers at three days old, and thereafter produced four young ones every day, so that even in the short space of twenty days the progeny of one specimen, if all were preserved from destruction, would number upwards of two millions.'

Some of the useful facts derived from a knowledge of the life history of the Hop Aphis, are that, as the eggs are laid upon plum trees and pass the winter there, it is important not to allow wild or useless cultivated plums to grow round hop yards ; but, if these trees are growing in the vicinity and it is impracticable to destroy them, the value of treating these before the eggs hatch, or just at the time the young plant-lice are hatching in May, with kerosene emulsion, or a whale-oil soap solution, is manifest. As the males are only produced at one season of the year and this on the hop plants after the females have migrated to plum trees, the utility is plainly shown of burning up at once after the crop is picked all the vines and leaves of the hop plants. In this way, it is believed that so many of the males will be destroyed that there will not be enough left to fertilize all the females which have flown away to the plum trees. Although plant-lice can produce young for a long time without the intervention of males, when the time comes for the perfectly sexed females to be produced, the males are necessary for the fertilization of the over-wintering eggs.

As there are three broods produced upon plum trees subsequent to the hatching of the eggs, it is not until comparatively late in the season that the plant lice appear upon the hop vines. It is an important observation then to know exactly at what date this migration from the plum trees to the hops takes place, because these insects are exceptionally prolific and multiply with enormous rapidity as soon as they reach the hops. Consequently the sooner the plants are sprayed to destroy the aphides the easier that work will be accomplished and naturally at a much smaller loss of vitality to the plants. In New York State the migration from the plum trees to the hops takes place in the month of May, so it is probable that this may also be expected about the end of that month, or early in June, in southern Ontario.

As to the best insecticide for controlling the Hop Aphis, there are several which may be used. Kerosene emulsion diluted to as weak a wash as one part to twenty-five of soft water, will kill the insects upon the foliage at the time they migrate to the hop plants. This strength will not injure the leaves, which it is stated is the case with stronger mixtures. To destroy the winter eggs on plum trees a much stronger mixture of the emulsion, viz., one to six, is necessary. Instead of the above, whale-oil soap, one pound to six gallons of water, may be used on the hop vines. The remedy, however, which is by far most generally used by hop growers in England, California and British Columbia, is the one which has been styled the 'English wash,' and is the standard remedy for the Hop Aphis in the hop gardens of the south of England. It is very similar to the one used by Mr. Corby, mentioned above :

100 gallons of soft water (if the water is hard add soda).
4 to 5 lbs. of soft soap.
6 to 8 lbs. of quassia chips, first steeped in cold water and afterwards boiled for one hour before mixing with the main supply of water.

The value of this wash has been clearly shown in England, where some hop-growers, as is the case with ourselves, do good careful work and get large and paying crops of hops of the first quality, while others who do not attend to these important matters get nothing at all or very little. The points most to be borne in mind by hop growers in this conection are,—that early work is less troublesome, less expensive, and pays enormously all trouble taken, therefore constant attention must be given to the yards at the time the insects migrate to them, and lastly, that one application of any remedy is not sufficient. The washes effective against plant lice, unlike the arsenical poisons which are placed on foliage and remain active for a long time until eaten by insects, are contact remedies only which, to be of any use, must actually be thrown on to each individual insect ; moreover, as the plant-lice do not all migrate to the hops at the same time, two or three applications at short intervals may be necessary. Throughout the summer the various broods of the hop aphis are wingless, therefore, if the first broods which appear on the hops are thoroughly dealt with, the yards can be kept clear for the rest of the season.

## ROOTS AND VEGETABLES

Roots crops in all the eastern provinces of the Dominion have suffered from the unusual weather which prevailed generally last spring from the lakes to the Atlantic coast. The dry late spring prevented prompt germination of seed when sown early. Mangels were not up to average, from poor germination and the attacks of cutworms, Sugar beets, which are now being grown in many parts of Canada both for sugar and for stock, gave a fair crop. Turnips, where not injured by cutworms and the Turnip Aphis, gave good returns, particularly from late sowings put in after the June rains. Potatoes did not start well, owing to the drought of May and early June. The crop, however, was fairly good in size and quality, where not injured by the 'Potato Rot.' This disease, which can to such a large extent be prevented by spraying with Bordeaux mixture, as has frequently been pointed out in these reports, was, it is to be regretted, very destructive from the Maritime Provinces to the Prairies. The following extracts from Mr. B. W. Chipman's Nova Scotia government crop report for November last, are well worthy of consideration by the thousands of farmers and others who grow potatoes either in large or small quantities :—

'Chester.—The potato crop will be heavy and of large size, but the rot has begun in some places very badly. Early spraying with Bordeaux mixture has proved beyond doubt a preventive for blight rot, and should be thoroughly tested by all potato growers. The trial costs little and the result in this district has proved its value. Spray as soon as the plant is in blossom, and twice at intervals of two weeks later on, if the season is wet.'

'New Germany.—No potato bugs. Potatoes took blight about September 1, and in some cases 50 per cent are rotten. One man here, and only one, as far as I know, sprayed his potatoes, with the result that less than 1 per cent were rotten.'

The results of demonstration experiments which have been carried on at the Central Experimental Farm, Ottawa, year after year, for many years, have uniformly shown the enormous benefit of spraying potato vines about August 1, and twice afterwards at intervals of 15 days, with the Bordeaux mixture, which for this purpose contains bluestone, 6 lbs.; unslaked lime, 4 lbs.; Paris green (to destroy leaf eating insects) 4 ozs., and soft water 40 gallons.

In the Ontario crop report for November last, Prof. James refers to the prevalence of the potato rot and estimates the loss at from 10 to 60 per cent in various localities. Mangels were in some places replaced by turnips, where the seeds had not germinated well, and turnips, although yielding a good crop, were in many quarters considerably injured by the Turnip Aphis.

The Colorado Potato Beetle was reported from all sections as being less abundant than for many years. The following reports are representative of many others received:—

'Charlottetown, P.E.I.—Root crops were badly injured by cutworms, and many fields were resown for the third time; some land was ploughed up and sown to other crops. The yield of roots was fair on the decreased acreage; the cutworms seem to have been general over the whole province.'—E. J. McMillan.

'Halifax, N.S.—Roots and vegetables good; potatoes above the average. No complaint of injurious insects on potatoes except the potato bug, and that was not as bad as usual. In some places, mangels, beans and vegetables were injured by cutworms. Turnips were somewhat attacked by aphis.'—B. W. Chipman.

There were not many large fields of roots this year in the province of Quebec. Many thought that it was too late after the rain came to bother with roots, so on the whole there will not be a very large crop. Some few have fair pieces.'—Peter Macfarlane.

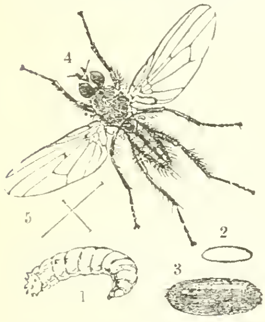

Fig. 6.—Cabbage Maggot: 1-3, maggot and pupa case; 4, fly—1, 3 and 4 enlarged.

Root Maggots.—Among vegetables, considerable injury has been done in nearly all parts of the Dominion by root maggots. The Cabbage or Radish Maggot, and the Onion Maggot, which for all practical purposes may be treated of as the same species, caused great loss in crops of cauliflowers, early cabbages, turnips, radishes and onions. The occurrence, however, was irregular, much harm being done in spots, while in another not very far distant there was no appearance of the attack. There is nothing new so far in the shape of a remedy for these insects when large areas have to be treated; but some experiments which have been carried on by the Horticulturist at the Central Experimental Farm during the past summer with the object of producing early tobacco and vegetables of high quality, have an important entomological bearing which is well worthy of mention. An enclosure was made of a light framework of wood, six feet in height, and covered entirely on the top and along the sides with cheese cloth. In this tent tobacco and various kinds of vegetables were sown, or planted, and a similar duplicate plot was also planted just outside with the same conditions of soil and soil moisture. The rows of this plot were practically in continuation of those inside the enclosure. This experiment was satisfactory, both as to forcing the plants forward to earlier maturity, and on account of the important discovery made by Mr. Macoun that this cheap protection prevented entirely the attacks of many kinds of injurious insects. Radishes, onions, cabbages and cauliflowers developed well and were absolutely free from root maggots. Nothing was attacked by the troublesome Tarnished Plant Bug *(Lygus pratensis*, L.) or the Four-lined Leaf Bug *(Pœcilocapsus lineatus*, Fab.). Cucurbits of all kinds were entirely free from injury by the Striped Cucumber Beetle. In fact, this experiment has furnished us with a sure means of growing many vegetables of which, from the difficulty of getting them into perfect condition, gardeners had in some places given up the cultivation. This is particularly the case with cauliflowers, early cabbage, radishes, onions and other plants of only moderate height. These could be entirely protected by a framework which any ordinary workman could make, only three feet high and three feet wide for single rows in a garden. With such a covering, it would be impossible to cultivate between the rows; but, if made in sections, these could be removed for that purpose when necessary. The cost of building an inclosure in which a man could work with ease and where several hundreds of plants could be grown, would be little compared with the increased price which would be obtainable for the earlier and much superior crop. Careful handling in taking down and storing away the cheese cloth and framework would insure the lasting of these for at least two or three years. These inclosures are manifestly better suited for the cultivation of some plants than for others; such plants as egg plants and cucurbits, which depend on the intervention of insects for the fertilization of their flowers, would require to be fertilized by hand if grown in these inclosures. A noteworthy result of these experiments was that the vegetables grown within the inclosure were entirely free from attacks of root maggots, while those grown in the corresponding plot outside were badly affected.

Remedies for root maggots are frequently asked for, and those which have been recommended in the past are as follows : For early cabbage and cauliflowers, the best remedy is undoubtedly an early application of the disks of tarred paper recommended by Prof. Slingerland. We use these regularly at the Central Experimental Farm, and always with great satisfaction. Where these have not been put on early, a remedy which may be used is to pour about half a teacupful of a strong decoction of pyrethrum insect powder, four ounces to the gallon of water, around the roots of each plant, after drawing away the earth right down to the rootlets. The earth must then be pushed back again. For onions and radishes, dusting white hellebore along the rows as soon as the young plants appear, has given good results in seasons when the flies are not abnormally abundant. Kerosene emulsion and a solution of whale-oil soap have also been used by some. Another excellent remedy is the carbolic wash recommended by Prof. A. J. Cook many years ago. This consists of boiling up one quart of soft soap or one pound of hard soap in a gallon of water. When boiling, add half a pint of crude carbolic acid. Boil for a few minutes and stir thoroughly. The mixture is then ready to be stored away for future use. When required, take one part of this mixture by measure to fifty of water, and sprinkle or spray directly upon the growing plants once a week from the time they appear above the ground.

The Cabbage and Turnip Aphis *(Aphis brassicæ, L.)*.—Although not so injurious as it has been in some previous years, this insect was the cause of considerable loss in British Columbia, Ontario, Nova Scotia and Prince Edward Island. The worst attacks were probably in Prince Edward Island and Nova Scotia, whence frequent requests for information came. The injuries were to both cabbages and turnips. When cabbages in gardens are attacked, the insect should be looked for when the plants are being cultivated, and, as soon as the first colonies appear, which will probably be late in July or in August, they should be attended to at once, before they increase in numbers. Whale-oil soap, one pound in six gallons of water, or the ordinary 1 to 9 dilution of kerosene emulsion, if sprayed thoroughly, will destroy the aphis. In turnip fields, where by far the greatest amount of injury is done, those engaged in thinning and hoeing should be constantly on the watch for infested plants, which may at that time be hoed out and destroyed. This will, in many instances, be sufficient to prevent the occurrence later of a serious outbreak. The eggs of this insect are laid on the turnip tops late in autumn. This suggests the

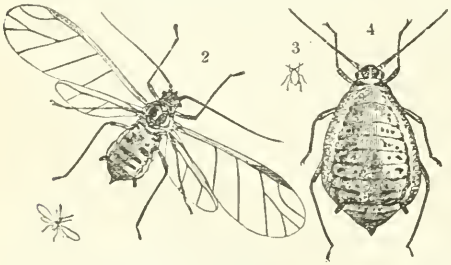

Fig. 7.—The Cabbage Aphis : 1 and 2, male; 3 and 4, wingless female—2 and 4 enlarged.

advisability of ploughing down deeply all tops which are cut from the roots at the time of harvesting in autumn, so as to destroy the eggs. In fields of cabbages, where also eggs are laid, the same practice should prevail when the cabbages cannot be fed or are too poor to store for feed purposes. The leaving of poor or imperfectly developed crops in the field until the following spring is always a dangerous practice from the point of view of those who study insect attacks. Not only may the crop have been reduced to its worthless condition by the attacks of insects which will pass the winter safely among the plants; but, even on well developed plants, there are always certain natural enemies the presence of which is detrimental to the farmer and gardener. Whenever possible, all haulms, vines, stems and foliage should be fed to stock; but, in the few cases where these are useless, they should be ploughed down into the soil to decay or be burnt, and, when this can be done in autumn, it is far better than waiting till the following spring. Many insects and fungous diseases are thus destroyed or placed where they can do no harm, and much time is saved in spring in having the land in a condition to start work at once.

CUTWORMS.—These troublesome caterpillars have, as is usually the case, been more or less destructive to field and garden crops everywhere: but in Nova Scotia and Prince Edward Island almost every report mentions their depredations, and the official crop reports from these provinces show that considerable harm was done in almost every county. Such specimens as were received at the Division were the Red-backed Cutworm *(Paragrotis ochrogaster*, Gn.). The same species was the one responsible for most of the harm done in Quebec, Ontario and Manitoba. In Ontario it was accompanied by the Dark-sided Cutworm *(Paragrotis messoria*, Harr.), which was enormously abundant in some places at Ottawa. Here also in restricted localities the so-called Climbing Cutworm *(Paragrotis scandens*, Riley) was troublesome in sandy fields. At Regina and Calgary, N.W.T., the species which did harm in gardens was *Chorizagrotis auxiliaris*, Grt., the large caterpillars of which resemble the Red-backed Cutworm in a general way, and are equally omnivorous, destroying all kinds of succulent plants. The moths of *C. auxiliaris*, Grt., as well as of the allied *C. introferens*, Grt., and *C. agrestis*, Grt., both of which, possibly, are only varieties of *C. auxiliaris*, Grt., have been taken in large numbers at Millarville, 20 miles south of Calgary, by Mr. F. H. Wolley-Dod, and by Mr. T. N. Willing, at various places north and south of Regina. In Vancouver Island the species which was most troublesome proved to be *Paragrotis perexcellens*, Grt., which was very much commoner than it had been for some years. In 1885 it was a perfect plague in market gardens around Victoria, and in 1888 specimens were also sent to me, which were at that time incorrectly identified and mentioned in my report for 1888 as an allied species, under the name of *Agrotis obeliscoides*, Gn.

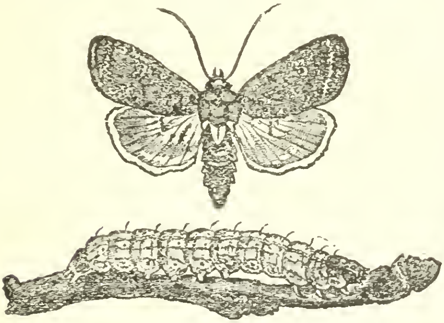

Fig. 8.—The Climbing Cutworm: moth and caterpillar.

All of the species mentioned above have the same feeding habits and would be controlled by the same measures, which are: The removal from gardens or fields, as early as possible in the autumn after crops are reaped of all refuse, and the cultivation of the land so as to prevent the deposition of eggs. This takes place during August and September, and some of the eggs, if not all of them, remain unhatched until the following spring; therefore, late fall ploughing, or early spring ploughing, by which the eggs were buried deeply would be beneficial. When in large numbers, these caterpillars, like most other cutworms, wander long distances at night in search of food. Therefore, it is necessary to make some direct application to destroy them. For this purpose, the best remedy in my experience is the poisoned bran mash, which is remarkably efficacious. In making this material, which is equally useful in field practice as in gardens, it is best to dampen some of the bran slightly with water containing a little sugar. After mixing thoroughly, add the Paris green little by little, stirring all the time. If Paris green is added to the bran when it is perfectly dry, it will, owing to its weight, sink at once to the bottom when stirred. Half a pound of Paris green is sufficient to poison 50 lbs. of bran, although double this amount may be used. Bran should be added to the mixture until it will crumble easily and run through the fingers without adhering. It may then be distributed through or along the edge of an infested crop or may be applied to land either around or between plants, or a row may be run close to drills by means of a Planet Jr. seeder, or a similar implement. For such crops as tomatoes, cabbages, tobacco, &c., a collar of paper put around the stem at the time of planting, will prevent the destruction of many plants. Seedlings must be planted so that none of the leaves hang down and touch the ground. The same protection is provided in a more permanent manner, but at greater cost, with strips of tin. Convenient rings may be made from old tomato and fruit cans by throwing these into a bonfire and melting off the tops and bottoms and then splitting the sheet of tin which is left down the centre. This not only makes a good protection against cutworms, but disposes of a class of rubbish which often accumulates to an inconvenient degree.

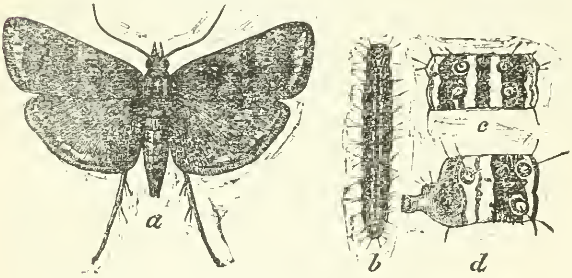

Fig. 9.—The Sugar-beet Webworm: *a*, moth; *b*, caterpillar; *c*, *d*, segment of *b*—all enlarged. (Chittenden, U. S. Dept. of Agriculture.)

The Sugar-beet Webworm *(Loxostege sticticalis, L.)*.—When in Manitoba last July, my attention was drawn by Mr. Hugh McKellar to reports which appeared in the newspapers of swarms of a small blackish caterpillar which had appeared at Brandon and other points east and west of that city, and which after devouring its natural food plants, had wandered in armies to new fields in search of food. The first notice of this insect in 1903, came to me from Mr. J. R. McMullen, of Melita, Man., who stated that two years before this he had noticed enormous numbers of small moths among his wheat in the month of June. He writes on June 15, in a letter addressed to the Department of Agriculture for Manitoba, which was referred to me, an interesting account of an excessive occurrence of the caterpillars during 1902, as follows: 'I thought no more of these moths until last summer. I had ploughed a field of stubble in June and sowed it in Brome grass, of which I got a good catch. There was a lot of pigweed in it, and, when the weeds were about four or five inches high. I was surprised to see thousands, yes millions of worms, eating up the pigweed, making a complete job and killing it entirely. On thirty acres they ate every pigweed, but very little of the grass or any other plants. They started to work on the north side of the field and travelled south. Nothing would turn them. When they came to the tub where the horses are watered, they crawled up the sides and fell into the water by thousands; even when they came to the house, they crawled up the walls and clean over the house. These caterpillars were from three-quarters of an inch to an inch long, greenish in colour and with yellow stripes down the back and sides for the full length of their bodies. On the back the stripes were widened out or dotted in ten or a dozen places. When they reached the garden, they ate nothing except beets, although they tasted some other vegetables but did not eat much of them. They came to a big field of wheat just headed out, but did it no harm. In four or five days they were all gone. I did not notice any of the moths last year, but now (June 15), the moths are thick, and I send you a few to examine. I should like to know what these are, although they did me no harm last year; in fact, they saved me a day or two's work cutting weeds, but I might not have a field of pigweed ready for them when they come again.'

The Sugar-beet Webworm can hardly be described as a green caterpillar, because it is dark black, with greenish yellow stripes, but, strange to say, almost every correspondent who mentioned it referred to it as a green caterpillar. As, however, in most instances specimens of the caterpillars accompanied the inquiries, there was no doubt as to the identity of the species, which has been kindly supplied to me by Dr. Dyar, of the Division of Entomology, at Washington. It would appear from the dates when caterpillars are mentioned by observers in Manitoba, that there were two broods of this insect last summer. The life history of the species has been carefully worked out by the Division of Entomology at Washington, and illustrated articles have appeared upon it in 'Insect Life,' V. and VI., and in the recent Bulletin 43, by Mr. F. H. Chittenden, on the 'Principal Insect Enemies of the Sugar-beet.' The excellent illustrations given herewith have been kindly lent to me by Dr. Howard and were used in the last named bulletin.

The following letter gives some idea of the range of plants liable to be attacked by these caterpillars. There is no doubt that the normal food plant is the Lamb's-quarters or Wild Spinach *(Chenopodium album.* L.), often called pigweed.

'Deleau, Man., July 21.—We have had a visitation from a pest that I have never seen before in my 21 years' residence here. About two weeks ago we noticed the pigweed on land left for summer-fallowing covered with a greenish worm, samples of which I send you. In a day or two these swarmed into the garden in millions. They scarcely touched potatoes, beans or corn, but devoured turnips, beets, cabbages, onions, carrots, currant bushes, and even crap-apple leaves. We made a vigorous fight to save something, making narrow trenches for them to fall into, and tried various poisons, but without avail; so, we stuck systematically to knocking them into tin pans and emptying these into pails of water with coal oil in them. In this way we caught several pailfuls in a day. They have now almost disappeared but have left the garden in a very dilapidated condition. As soon as we noticed them coming off summer-fallow, we ploughed the land next to our garden, but they swarmed over on top of the ploughing. They seem to be good travellers. I should like to know what they are.'—J. E. Marples.

Specimens of the caterpillars were sent, without any letter being received, from Mr. H. L. Patmore, of Brandon.

Mr. Norman Criddle, of Aweme, sends the following notes :

'Sept. 5.—Do you remember mentioning when here a small prairie moth, which one of your correspondents was afraid of as a possible enemy of wheat. I am sending you now what I am pretty sure are the larvæ of the moths you showed me. These caterpillars are here now simply in enormous numbers, more so than anything of the sort I have ever seen. They clear off all the food before them and then march on in a regular swarm, all going the same way. The food plant seems to be usually lamb's-quarters, but this has been all eaten clean, and they are now turning their attention to wild buckwheat, the native asters, the tumble-weed *(Amarantus),* sand cherry, red cherry, rose, red-root pigweed, and even wheat and oats, as well as numerous other plants. Fortunately, they are too late in the season to do much harm, and in any case they seem to prefer weeds to grain. The moths were very abundant during June and July.'

'Sept. 27.—The larvæ have now all disappeared beneath the ground, but whether to hibernate or pupate, I am not quite sure. Several that I dug out had not yet undergone any change, but had merely made a straight burrow about two inches deep, which they had lined somewhat loosely with web. In reply to your letter, the food preferred to all others is lamb's-quarters, and wheat was only attacked when all other plants had been eaten. So far, instead of this insect being an enemy, the caterpillars have proved undoubted friends.'

'Oct. 18.—I went out this morning to try and find out for you whether the larvæ of *Loxostege sticticalis,* L., had turned to pupæ or not. I found they were all hibernating as larvæ, as you suspected. They are from one to two inches beneath the ground in a closely woven chamber of web, and they are now very sluggish.'

The Sugar-beet Webworm is stated by Mr. Chittenden in his bulletin, to be an introduced insect from western and central Europe and northern Asia, which is evidently slowly but steadily pushing its way eastward. From the letters given above, it is quite apparent that the outbreak of last summer was exceptional, and also that the favourite food plant is the well known and troublesome weed of western wheat fields, the lamb's-quarters, and allied plants. As, however, the sugar-beet is one of these and great efforts are being made in the West to foster the cultivation of this crop, it seems important to make the appearance and habits of this insect well known. The most important points with regard to these are as follows : The pale yellow eggs are laid singly or in rows of two to five, overlapping like fish scales. The young larvæ are at first whitish, with polished black heads and bristle-bearing spots. They soon become blackish caterpillars with thin skins, through which the green contents of the body show. These are very voracious and very soon strip plants of their leaves. The caterpillars appear in July and early September. Pupation takes place in the ground, not deeper than two inches beneath the surface, consequently they can be reached and disturbed by the teeth of an ordinary cultivator at the time they are in the delicate chrysalis condition. Actual experiments are reported by Dr. Howard (Insect Life, VI., p. 37) to have been successful with the winter brood. It would doubtless be so with the summer brood. Prompt attention in spraying an infested crop with arsenical poisons will certainly control this insect should it ever become troublesome in crops of sugar beets. Such plants as spinach in gardens could not, of course, be treated with poison. In those cases, mechanical means of prevention as ditching, might be tried.

## FRUIT CROPS.

A satisfactory feature of the year 1903, like that of the previous year, has been a marked decrease in the injuries caused by some of the well known pests of the fruit-grower. The Tent Caterpillars, Cankerworms, Squash Bugs, and even the Codling Moth, in most places may be said to have done hardly any harm. Fruit crops have been exceptionally remunerative. The apple crop in Nova Scotia was a remarkably good one, large in quantity and excellent in quality, being very free from insect attacks as well as from Black Spot and other fungous diseases. (B. W. Chipman.) In Prince Edward Island the crop was 'rather poor, having been injured by the late frosts and dry weather in spring.' (E. J. McMillan.) Through Quebec and Ontario the crop on the trees was not so large as in some previous years, but the quality was so exceptionally good that there was a larger quantity of A 1 fruit for export than has been the case for several years. Only in the west of Ontario was any trouble experienced with Black Spot fungus, or insect enemies. In British Columbia apple crops were somewhat reduced by the attacks of the Apple Aphis, but the output was large and of excellent quality. The poor crop of apples in England last season gave Canadian growers a good opportunity of showing to what exceptional excellence this valuable fruit can be grown in this country, and the large quantity shipped up to the end of November, over 1,000,000 barrels, with a probable total export of 2,000,000 by the end of the season, as well as the high quality of the fruit, will no doubt make a lasting impression on the British market.*

'There was a fair yield of apples; but in various parts of the province of Ontario complaints were made of the scarcity of barrels, and, on this account, buyers were more particular than ever in the selection of this fruit ; thousands of bushels of apples that in former years would have passed for shipment to Great Britain, were this season rejected by them.'—(C. C. James).

Not only was the quality of the fruit exported this year better for the above reason, but the rigorous application of the 'Fruit Marks Act' has prevented much second-rate fruit from going forward, which otherwise would have found its way to the British markets. This will be a decided and lasting benefit to the country. Grapes were a good crop in the Niagara peninsula, but in Essex and Kent the crop was practically destroyed by the Black Rot of the Grape *(Lœstadia Bidwelli*, V. & R.) Plums were an enormous crop in almost all parts of the Dominion, injuries by the Plum Curculio being considered this year rather a benefit than otherwise for the work they did in thinning fruit on the overloaded trees. The only discounted reports as to plums were from some parts of the maritime provinces. In British Columbia considerable loss occurred from the attacks of the fungous disease known as Brown Rot or Ripe Rot (*Monilia fructigena*), which attacks the fruit just when it is ready for the market. This loss was chiefly on Vancouver Island and near the coast on the mainland. Orchards which had been sprayed early in spring and where the diseased plums had been carefully gathered and destroyed, were noticeably freer from attack than where no remedial measures had been adopted. The Shot-hole Fungus (*Cylindrosporium padi*) also did considerable injury by defoliating the trees before the fruit was ripe. This, like the last named disease, can be controlled by regular spraying. Peaches were an enormous crop of excellent quality. Cherries were fair on Prince Edward Island, good in New Brunswick and Nova Scotia, excellent and abundant in Quebec, Ontario and British Columbia. The pear crop is reported as good ; but the ravages of the Pear-tree Slug were serious in some places, and the Pear-tree Flea-louse is reported by Prof. Lochhead as having been very injurious in the Grimsby district of Ontario. On the fruit farm of Mr. W. R. Dewar, trees were much stunted and were covered with the dirty black fungus, *Fumago salicina*, which develops upon the honey-dew emitted by this insect and various other kinds of plant-lice. Berries and small fruits generally were seriously affected by the drought of early summer through the region where this prevailed. The rains, which came about the middle of June, were too late to save the strawberry crop but helped considerably raspberries and currants. Cranberries in Nova Scotia did not produce such a paying crop as usual, but this was not due to any trouble with insect enemies. In Prince Edward Island this crop was reported as 'fair.'

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* The following extract from the 'Glasgow Herald' of January 5, 1904, in an article upon the Fruit Imports into the United Kingdom in 1903 is significent : 'Green Fruit Import. The apple trade was unique, 1903 being a bumper year. The total weight was 4,550,000 cwt. valued at £2,850,000. In ten years the imports have been nearly doubled ; 1903 even surpassed 1896, which was the most prolific season of recent years. The imports in favour of 1903 against 1896 are 3,000,000 bushels. We get the largest parcels from the United States and Canada. These countries send us more than 2,500,000 cwt. annually. Of course, the Canadian apples are much superior to those of the United States.

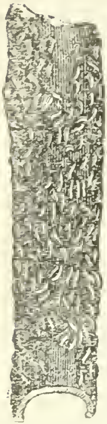

Fig. 10.—Twig infested with Oyster-shell Bark-louse.

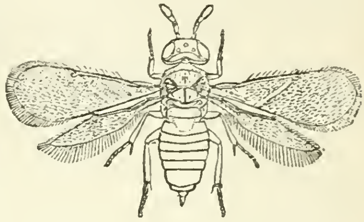

Fig. 11.—*Aphelinus mytilaspidis.*

OYSTER-SHELL BARK-LOUSE (*Mytilaspis ulmi*, L=*M. pomorum*, Bouché) has been complained of from almost every part of the Dominion where fruit trees are grown; and the chief reason that it remains unchecked and continues to increase, seems to be that it is so often overlooked by fruit growers and others who ought to know such a common and destructive enemy by sight and also be well acquainted with the best means of fighting against it. In south-western Ontario excellent work has been done in preventing the spread of this scale by the minute chalcid parasite, *Aphelinus mytilaspidis*, LeBaron. The presence of the parasite in a district can be detected by the minute round holes left by the tiny parasites where they have eaten their way out through the tops of the old scales. This minute friend is so small that it can hardly be seen with the unaided eye. It is bright yellow in colour, with golden eyes, and measures only about one thirty-sixth of an inch in length. Under a magnifying glass, it is found to be a four-winged fly shaped as shown in the enlarged figure herewith. This parasite is sometimes so abundant that it destroys more than half of the scales which are formed. It has occurred in all parts of Canada but never seems to remain long in any district, a fact which is rather remarkable, as the Oyster-shell Bark-louse upon which it feeds is abundant everywhere. For the last year or two it has been noticed in large numbers upon scale-infested fruit trees in the Niagara district. There is only one brood of the Oyster-shell Bark-louse in the year. The young bark-lice emerge from beneath the old scale in Ontario and British Columbia about the end of May, and in the maritime provinces towards the end of June. At that time they are small six-legged insects resembling mites. After emerging, they wander about the trees for a few hours, looking for a suitable place to attach themselves to the bark, which they do by means of their slender beaks. Once having attached themselves, they never move from that place ; gradually their legs disappear, with the increase in size of their bodies, and a waxy scale is secreted over them. By the middle of August the female bark-louse has practically changed into a bag of eggs protected by a scale. Little by little the body of the mother insect dries up ; and, when all of her eggs are laid, the scale is well filled with these minute white objects, and the mother's body is merely an empty skin at the small end of the scale. The scales of the male bark-lice are seldom noticed. They are of different shape and, as a rule, occur on the leaves. They are much smaller than those of the female and are long, narrow and white. (Fig. 12*c*.) The perfect male is a tiny winged insect which is able to fly well.

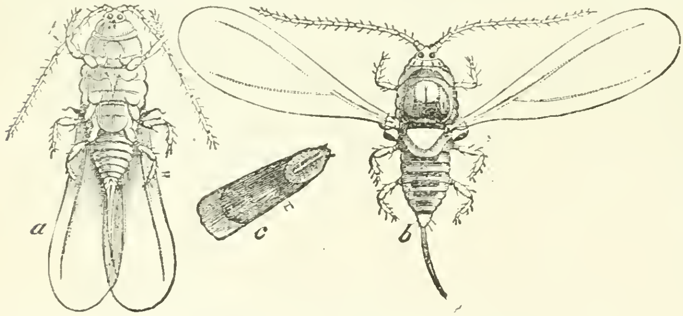

Fig. 12.—The Oyster-shell Bark-louse: *a*, *b*, male adult ; *c*, male scale—much enlarged.

Trees upon which this insect occurs, are weakened by being robbed of their sap by these small insects, which frequently occur in such enormous numbers as almost to coat the trees and entirely hide the bark. Although so destructive in all parts of Canada, the Oyster-shell Bark-louse is not a particularly hard insect to control, where trees are attended to regularly. The first step to take when an orchard is found to be attacked is to invigorate the trees by ploughing round them and feeding them with some quick-acting fertilizer, such as well rotted manure, or a dressing of wood ashes. When trees have been standing in sod, it is well to break this up. Trees which are planted too closely, should be pruned and cleaned out, so that they may be easy of access for spraying and other operations. As soon as winter has set in, the trees should be sprayed thoroughly with a thin lime wash, one pound of lime in each gallon of water. Two coats must be applied, the second immediately after the first is dry. Where the lime-sulphur-and-salt wash is used to protect trees against fungus and insect enemies, there will never be any trouble with the Oyster-shell Bark-louse. The young bark-lice emerge from their mothers' scales during June ; the exact date should be watched for, and, immediately the dust-like yellow mites are noticed, the trees should be sprayed without delay with weak kerosene emulsion, or a whale-oil soap solution, using one pound to six gallons of water.

The SCURFY BARK-LOUSE (*Chionaspis furfura,* Fitch.)—In western Ontario this bark-louse has become so abundant recently, that many fruit growers are noticing it. In several cases, it has been mistaken for the San José scale and has been sent in for that insect. It is only occasionally that this scale develops in sufficient numbers to injure trees seriously. When it does so, it can be treated in the same way as the Oyster-shell Bark-louse. Mr. W. W. Hilborn found it was entirely destroyed by the lime-sulphur-and-salt wash. The eggs of the Scurfy Bark-louse are bright red in colour and are to be found beneath the scales by the middle of August or early in September. The male scale, as in the case of the Oyster-shell Bark-louse, is of quite a different shape from that of the female. In both sexes the scales are white and so closely appressed to the bark that they are easily overlooked or are not recognized as scale insects. The male scales are frequently found all clustered together in groups around the base of a twig or at some inequality of the bark.

The EYE-SPOTTED BUD-MOTH (*Tmetocera ocellana,* Schiff).—The insect concerning which most inquiry was received from Nova Scotia last spring, was the Eye-spotted Bud-moth. Attention had already been called to it by its frequency in Nova Scotian orchards during the previous year, and specimens also came in from some parts of Ontario and Quebec and from one point in British Columbia. Prof. F. C. Sears, Director of the Nova Scotia School of Horticulture, of Wolfville, N.S., writes at the end of the season : 'Even the Bud-moth, which for the past few seasons has been extremely abundant, proved much less troublesome than was anticipated. This was undoubtedly due in large measure to the fact that our orchardists now understand it better and apply the early spraying, by which it is best controlled. We find that this early spraying should be applied from May 1st to 10th, according to the season. I am glad to report that spraying was much more general during the past season than ever before, particularly in Annapolis County. One dealer there sold one hundred spraying outfits ; but, as the season was particularly unfavourable for fungous pests and most insects, I fear that some that sprayed for the first time may be discouraged.' It was suggested by Mr. E. E. Archibald, of Wolfville, N.S., that the irregularity in the fruit crop in the celebrated Annapolis valley of Nova Scotia might be due to the depredations of this small but very destructive and frequently unrecognized enemy. I believe that his suggestion was in a large measure correct and, where correspondents had reported a blighting of the leaves and fruit buds, I am sure these results had been in many cases directly due to the attacks of the caterpillars of the Eye-spotted Bud-moth. On account of its abundance last year, it will be wise for fruit growers to examine their trees during the present winter and early next spring, to see if there are any of the small brown caterpillars upon them, and, should they find any, to be prepared to spray their orchards thoroughly, just at the time the buds are bursting, with a poisoned Bordeaux mixture, this being the remedy,—of many which have been tried,—which has given the best results. This mixture, made according to the formula which we use at the Experimental Farm, is as follows:—

| | |
|---|---|
| Copper sulphate (bluestone) | 4 lbs. |
| Unslaked lime | 4 lbs. |
| Paris green (for Bud-moth and other leaf-eating insects) | 8 oz. |
| Water (one barrel) | 40 gals. |

Dissolve the copper sulphate by suspending it inside a cotton bag in a wooden or earthen vessel containing five or more gallons of water. Slake the lime in another vessel, and then strain the lime wash through coarse sacking or a fine sieve. Pour the copper sulphate solution into a barrel, or it may be dissolved in this in the first place, and fill the barrel with water. Stir thoroughly before using. A stock solution of copper sulphate, and lime wash may be prepared and kept in separate covered barrels through the spraying season; but the quantities of copper sulphate and lime in the solutions should be carefully noted, so that the proper strength may be used when a wash is required for spraying.

The caterpillars of the Eye-spotted Bud-moth pass the winter on the twigs of trees, upon the foliage of which the eggs had been laid the previous summer. Each caterpillar is snugly curled up inside a small silken tent or covering called a pseudo-cocoon. These are extremely difficult to find until their appearance is known. They are located, as a rule, right in the crotch between two twigs, or in any small depression on a fruit spur. In many instances, I have found that a small piece of leaf or of lichen, is attached to the outside. On opening these with the tip of a knife, the small brown black-headed caterpillar, one-eighth of an inch in length, will be found inside. These caterpillars when they go into winter quarters are less than half-grown, having passed through three or four of their six moults. Early in spring, just before the time that the leaf buds burst, they emerge from their shelters and attack the opening leaf and flower buds. They do a great deal of harm at this time because they not only devour the young leaves but a single caterpillar will destroy a whole cluster of flowers. Their injuries are severe, both upon young trees and also upon full-grown bearing trees, which in some instances have been stripped of almost every bunch of flowers. These caterpillars become full-grown during June and then spin cocoons among the dead leaves which they have injured. The small gray and white moths appear during the month of July. These moths are similar in shape and size to the Codling Moth but are of a general dark gray colour, blotched with white, which makes them very inconspicuous when they are at rest on the trunks of trees. They measure about three-fifths of an inch across the opened wings and may be recognized by an eye-like spot upon each of the fore wings. The moths appear from June to the middle of July ; they rest on the trees during the day time but are very active at night, flying about fruit trees and laying their eggs upon the leaves. The eggs are remarkable little objects which lie very flat upon the leaf on which they are deposited. Under a magnifying glass, they have more the appearance of minute drops of water, or of tiny fishes' scales than of the eggs of an insect. Ten days after the eggs are laid, the young caterpillars hatch, and their habits during the summer are quite different from those of the spring. As soon as the caterpillars hatch, they crawl to the middle of the lower side of the leaf and form a silken tube close to the midrib of one of the larger veins. Here they feed upon the tissues of the lower side of the leaf, leaving the network of veins and the upper surface of the leaf. As they extend their operations, they cover themselves with a light tent of silk. They grow slowly, remaining for eight or ten weeks on the same leaf where they were born ; they then stop feeding and crawl from the leaves to a convenient place on the twigs, where they spin their winter coverings. This generally takes place, Professor Slingerland found, in the first half of September, and is done irrespective of the weather, even if it be fine and hot, and there is abundance of food. Like all other insects, they seem to know instinctively that it is the proper time for them to prepare for winter. The spring appearance of the caterpillars, on the other hand, is much less regular as to date and will vary as much as three or four weeks, according as the spring and the time of the opening of the buds is early or late. However, it may be generally stated that the caterpillars leave their winter quarters and begin their depredations at the time the leaf buds open. There is only one brood of this insect in the year, the caterpillars which attack the leaves in the late summer, being the same ones which destroy the leaf buds the following spring. The moths appear at only one period in the year, viz., during the three or four weeks from the middle of June till the middle of July. Since the life-history of this insect has been discovered, better remedial measures have been devised than were previously known. The fact that the caterpillar passes the winter half-grown, accounts for the large amount of injury which is done so soon after growth begins in spring. The Eye-spotted Bud-moth attacks, besides the apple, the plum, the peach, the pear, the quince and the blackberry.

The remedy which, as stated above, has given the best results, is to spray the trees thoroughly with a Bordeaux and Paris green mixture at the time the buds are opening, covering the whole tree so that every bud may receive its share of poison. The Bordeaux mixture will also, when applied at that time, materially hold in check the troublesome Black Spot disease of the apple. There are, of course, many other kinds of poisons which may be used ; but those which have given the best results, are Paris green, Arsenate of Lead or Disparene, and Green and Pink Arsenoid. Where great care is exercised in mixing and making the application according to instructions and also in destroying carefully all surplus left on hand after spraying, white arsenic in any of its combinations may be used and will destroy all leaf-eating insects, upon trees which have been sprayed with a mixture containing it ; but its use is attended with considerable danger to foliage and also with great risk to animal life, including human beings, from having about a house or outbuilding a substance which so closely resembles so many materials used in a household. In Prof. Bailey's most useful little Horticulturists' Rule Book, under the head of arsenic, we find the following:—'Arsenic.—Known to chemists as arsenious acid or white oxide of arsenic. It is considered an unsafe insecticide, as its colour allows it to be mistaken for other substances; but in its various compounds it forms one of our best insectides. From one to two grains, or less, usually prove fatal to an adult; 30 grains will usually kill a horse, ten grains a cow, and one grain, or less, is usually fatal to a dog. In cases of poisoning, while awaiting a physician, give emetics ; and, after free vomiting, milk and eggs. Sugar and magnesia in milk is useful. In the very complete experiments which have been recently carried out under the instructions of Dr. L. O. Howard, the United States Entomologist, by Mr. C. B. Simpson, on the Codling Moth, the following important statement is made as to the insecticide which he found most useful in his extensive investigations:—

'*Arsenite of Lime with Soda.*

| | | |
|---|---|---|
| White arsenic | pound | 1 |
| Sal soda (crystal) | pounds | 4 |
| Water | gallon | 1 |

'The ingredients are boiled in the required amount of water until dissolved, which will take place in a comparatively few minutes, after which the water lost by evaporation is replaced. To every 40 or 50 gallons of water a pint of this stock solution and from 2 to 4 pounds of fresh slaked lime are added. The chemical compound derived from the combination of the sal soda and the white arsenic is arsenite of soda. In the presence of lime this breaks down and arsenite of lime is formed. It requires 4·4 pounds of crystal sal soda, or 1·6 pounds of dry sal soda to combine with one pound of arsenic, and 2 pounds of freshly slaked lime to combine with one pound of arsenic to form arsenite of lime. It is always desirable to have an excess of lime present, in order to prevent all danger of burning; furthermore this excess is a convenience to fruit growers, because they can see by the distribution and amount of lime on the foliage how well the spraying has been done. The formula, which is the Kedzie formula with a few minor changes, has been used in many different sections of the country with unvarying success. In all of the practical tests under the advice of the writer, this solution is used and is found to be, not only as efficient as other solutions, but far cheaper.'

'When it is desired to use Bordeaux mixture with this solution, it is added to the Bordeaux mixture in the same proportion as to a similar quantity of water.'

The above quotation is given here because I am aware that many fruit growers in different parts of Canada are using white arsenic in some form for spraying fruit trees in preference to Paris green, and moreover because considerable injury has followed this practice, which has to a certain measure served to discredit the most important practice of spraying fruit trees for the prevention of injury by leaf-eating insects. In my own experience, I prefer to use Paris green, knowing it to be perfectly effective and believing that, notwithstanding the fact that it is a little more expensive than some other arsenical insecticides, it yet repays enormously any expenditure by the improved condition of sprayed trees; but, if other substances are used, probably the Kedzie mixture is the best. Disparene, or arsenate of lead, is also another very valuable insecticide, one great feature in its favour being the length of time it remains effective on the foliage. Mr. Joseph Tweddle, of Fruitland, Ont., who not only himself grows very satisfactory crops in orchards which he has sprayed, but has also done much work in spraying orchards for other fruit growers, who have been well satisfied with the treatment used by Mr. Tweddle, tells me that the spray which he uses is made as follows:—'I boil half a pound of white arsenic in one gallon of water with one pound of lime for 45 minutes, and make up to the original quantity of water when it is finished boiling. I use this in 50 gallons of Bordeaux mixture for apple and pear trees, except for the third or fourth treatment when it will sometimes burn the foliage if used at this strength. I have never used it on plums and cherries at the above strength without doing some injury, and would always advise care in spraying so as not to drench the trees. I find this mixture very effective against all leaf-eating insects. When spraying peach trees for Curculio I use this mixture of half the strength without the Bordeaux mixture, and when with the latter not more than one quarter strength.'

Prof. C. P. Gillette, of Colorado, recommends a somewhat simpler method of preparing arsenate of lime, which is to boil for three-quarters of an hour one pound of white arsenic and two pounds of fresh lime in one gallon of water, and of this he uses one quart to an ordinary barrel of 40 gallons. Prof. Gillette also draws particular attention to the necessity of using fresh lump lime and of exercising the greatest care in labelling everything containing this mixture plainly 'Poison.'

The proportions in which I have found the best known arsenical poisons satisfactory, are as follows :

Paris green—1 pound to 160 gallons of water, with 1 pound fresh lime.

Arsenate of lead—1½ pounds to 50 gallons of water.

Green arsenoid—1 pound to 160 gallons water, with 1 pound fresh lime.

The Apple-leaf Sewer [*Ancylis (Phoxopteris) nubeculana*, Clem.].—Apple orchards at Fruitland, Grimsby, St. Catharines and Niagara-on-the Lake, were to a moderate extent infested last autumn by the small caterpillars of this insect. The sewed leaves were conspicuous on the trees in autumn. Inside these leaves, which fall to the ground, the caterpillars remain until the following spring, when they change to chrysalids; and the pretty moths which are shown at fig. 13, appear in May and June. The chrysalis works its way through the leaf, and, when the moth escapes, the empty skin remains attached to the leaf. This insect has never been a serious pest to the apple grower, and is only sometimes sufficiently abundant to attract notice. The only remedy which has been recommended, is to rake up the leaves in the autumn and burn them.

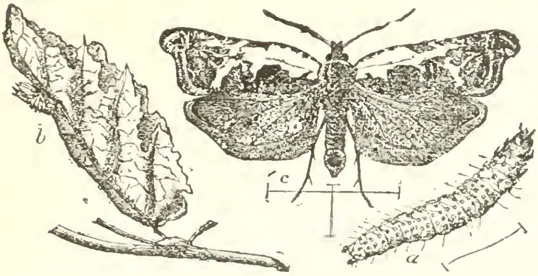

Fig. 13.—The Apple Leaf-sewer: *a*, caterpillar; *b*, pupa case on leaf; *c*, moth—*a* and *c* enlarged.

The Apple-leaf Miner (*Tischeria malifoliella*, Clem.)—Rather more abundant than the above and more destructive was this small leaf-miner. It occurred in several orchards near Grimsby, and Mr. Joseph Tweddle reports it as being sufficiently abundant to require attention. It has been noticed more or less in this same district for several years, specimens having been sent once or twice by Mr. Geo. E. Fisher, of Freeman, Ont., who had noticed it in orchards and nurseries in the above named district, when inspecting for San José scale. I do not think that it is ever likely to develop into a serious enemy, but it is advisable for students of insects to find out a little more than is at present known concerning its exact life history, so that, in case it ever requires special treatment, we may be prepared with a practical remedy, which as yet is wanting. The only remedy now suggested is to burn the fallen leaves in infested orchards, either in autumn or before the moths leave them in the spring.

The Apple Aphis (*Aphis mali*, Fab.).—Plant-lice of all kinds have been noticeably abundant on many crops throughout Canada and the northern United States during 1903. Although this has been the case, it cannot be said that their injuries have been excessive, for in nearly every instance, they were attended by large numbers of their natural parasites, which soon reduced the numbers so much that they were unable to do appreciable harm. The only injuries which could be considered serious, were where the insects attacked young stock in nurseries and fruits while young. Some of our large nurserymen in western Ontario inform me that Apple Aphis did them considerable harm last season, particularly upon budding stock, late in July and in August. In Prince Edward Island and in British Columbia, an injury which I have already alluded to as caused by the Apple Aphis, was again this year apparent on apples. This injury is of a serious nature, and takes the form of deep pits which are left on the growing fruit at spots where apples have been punctured by the aphis when they were small. This gives the fruit a distorted, gnarled appearance which renders it quite unsaleable.* As a general thing, except in British Columbia, it is not advisable to go to the expense of spraying bearing apple trees for destroying the Apple Aphis. The insects are most abundant when they first hatch from

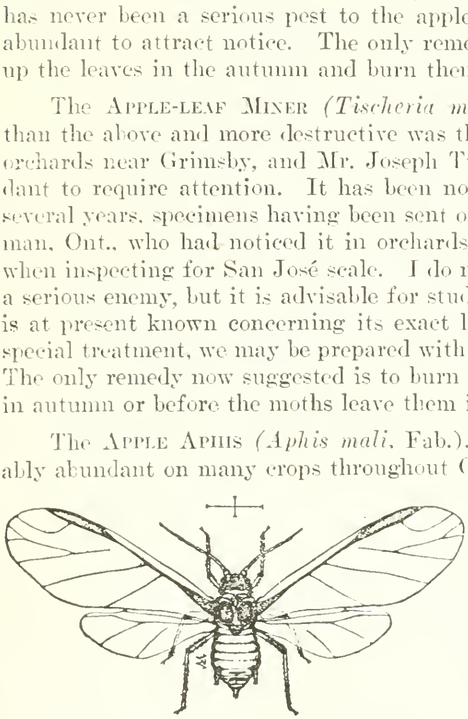

Fig. 14.—The Apple Aphis—enlarged.

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*See Fig. 15, next page.

the eggs, in which form they pass the winter. At that time the plant-lice cluster on the buds to such an extent as to almost hide them. With the rapid expansion of the foliage, they are soon lost sight of, and it is very seldom that serious injury results from their presence. Late in the autumn, when they come back again to apple trees after passing some time on grasses and fall wheat, they are again found in large numbers upon apple trees, where they lay their eggs. In British Columbia, this insect is one of the most destructive orchard pests the fruit-grower has to deal with, and treatment of infested trees is frequently a necessity.

It may also be noted that, although the Apple Aphis was troublesome last season in many parts of the Pacific province, Mr. Venables expressly states that the Apple Aphis was less abundant than usual at Vernon, although one might have expected it to have appeared in great force, judging from the large number of eggs laid in 1902. These, however, for the most part failed to hatch last spring. The Apple Aphis is a green plant-louse, having the head, the eyes and the thorax black. The head is pointed in front, and the prothorax has lateral tubercles. The antennæ are shorter than the body. On comparing this species with the Grain Aphis, which very much resembles it, the most striking differences are that in the latter species the eyes are reddish, the head and thorax brown and the head not pointed in front. The antennæ, which are a little longer than the body, are also borne on distinct frontal prominences. A remedy which answers well for the Apple Aphis, is to spray the infested trees thoroughly with whale-oil soap, one pound in six gallons of water, or with a tobacco and soap wash made by soaking ten pounds of tobacco leaves in hot water for a few hours, then straining off the liquid and adding two pounds of whale-oil soap. Stir until all is dissolved and fill up to make 40 gallons. If this wash is applied as a spray two or three times at short intervals, little difficulty will be met with in destroying the Apple Aphis

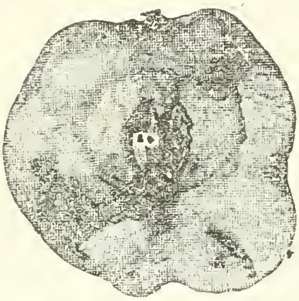
Fig. 15.—Section of Apple showing distortion of outline.

The injury to apples referred to above resembles very closely that of the small British Columbia Apple-fruit Miner (*Argyresthia conjugella*, Z.), as shown at fig. 15.

The PLUM APHIS (*Aphis prunifolii*, Fitch) was mentioned by correspondents several times during June, and trees infested were sprayed promptly with whale-oil soap or the tobacco and soap wash with good effect. In British Columbia an allied species, *Hyalopterus pruni*, Fab., was reported by Mr. E. P. Venables, of Vernon, B.C., as being in greater numbers than for several years past. The insect was also observed at several other places in British Columbia, both on the mainland and in Vancouver Island.

The CHERRY APHIS (*Myzus cerasi*, Fab.).—This is a black plant-house, which frequently appears in large numbers early in spring and clusters around the young fruit and along the stems of the fruit and leaves, sucking the sap and doing much harm. The eggs are laid upon the twigs during the autumn, the young plant lice not hatching until the following spring. This plant-louse has done a considerable amount of harm in western Ontario for several years, and during the past summer, although in most places it disappeared early in June, in others much loss resulted from its attacks. Mr. J. B. Fairbairn writing from Bowmanville, Ont., says: 'I have two English cherry trees that for years have had their crop ruined by this pest; two seasons ago I planted out three Montmorencys, and I find they also are covered with these insects. It seems almost impossible to destroy them without injuring the trees.' The Cherry Aphis is one of the class known as Black Plant-lice, and it is a remarkable fact which has not been accounted for, that all of these dark coloured plant-lice are much harder to kill than those which are of a green or light colour. For the Apple Aphis, Hop Aphis and other green-coloured species, one pound of whale-oil soap in 8 or 10 gallons of water is sufficiently strong to destroy them; but, for the black species, I have found that six gallons of water to one pound of soap is the greatest dilution which can be used. An important point, too, in fighting this insect, is early work, because, as the egg is upon twigs all through the winter, and the young hatch there in spring, they are easily reached with a small amount of spraying material, and early treatments before the leaves have expanded, have been found most effective. The kerosene emulsion may also be used with great success at any time after the weather becomes warm in spring, and before the leaves expand. For this purpose, the stock emulsion should only be diluted with six parts of water, instead of nine, as in the usual dilution for use upon foliage.

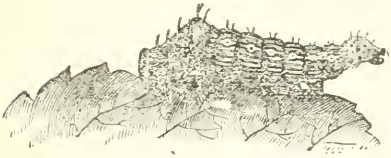

Fig. 16.—The Red-humped Apple-tree caterpillar.

The RED-HUMPED APPLE-TREE CATERPILLAR (*Schizura concinna*, S. & A.).—These voracious caterpillars were sent in from Nova Scotia, Quebec and Ontario, and were reported from British Columbia. Altogether, the species seems to have been rather more abundant than usual. The appearance of these caterpillars is well shown at fig. 16. The colours are as follows:—Head bright red, as is also a conspicuous hump on the fourth segment. The sides are striped with black, yellow and white lines. The blunt spines on the back are black. When at rest, the end of the body is raised and has, when viewed sideways, somewhat the shape of a dog's head. When full grown in autumn, they are a little more than an inch long. They then spin close parchment-like cocoons among the leaves on the ground, or a short distance beneath the surface, in which they remain unchanged until the following spring, when they assume the chrysalis condition, and the moths emerge towards the end of June. These are plainly coloured but prettily marked in varying shades of brown, which make them very inconspicuous when at rest, and, although the caterpillar is common, the moths are very seldom seen. These, when the wings are opened, expand from an inch to an inch and a half, the males, as a rule, being much smaller than the females. The eggs are deposited in clusters on the leaves of apple trees and occasionally on a few other kinds of trees, as willow, birch and oak. They are laid early in July, and by the end of that month the colonies of young caterpillars become conspicuous from the thorough way in which they strip whole branches of their leaves. At this time much good may be done by cutting off the branches and destroying the whole colony at once, as they very seldom wander far from each other, and when at rest, are massed together so as to hide the twigs and stem of the branch. The Red-humped Apple-tree Caterpillar has never appeared in Canada in sufficient numbers to be the cause of much loss to fruit growers, and, where trees are regularly sprayed with insecticides, this will never be the case. The species is much rarer in British Columbia than in the East, but I have on several occasions seen colonies upon wild willows, as well as upon apple trees in orchards. Mr. E. P. Venables reports it as more abundant than usual in 1903 at Vernon in the Okanagan valley. Prof. F. C. Sears sent specimens from Wolfville, N.S., Mr. P. E. Choquette, from St. Jerome, Que., and Mr. E. B. Yarwood, from Picton, Ont. A few colonies were also found at Ottawa.

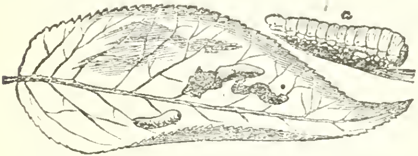

Fig. 17.—The Pear-tree Slug.

The PEAR-TREE SLUG (*Eriocampa cerasi*, Peck).—The slimy blackish slug-like larvæ were last year, as is too frequently the case with so easily controlled a pest, found very destructive in British Columbia to the foliage of pear and cherry trees. Specimens were also sent from Morrisburg, Ont., by Mr. Gordon Dill. The parent insect is a short, thick four-winged fly, about a quarter of an inch in length. It is glossy black, with pale legs, and has the habit, when an infested tree is touched, of drawing in the legs and falling to the ground. There are two broods in a season, the flies of the first brood appearing and laying their eggs early in June. These are inserted into the tissues of the leaf, where they remain for about a fortnight before the young slugs hatch. The greatest injury is done to fruit trees during July. The larvæ are sometimes, and indeed very frequently, in such enormous numbers as to strip the green cellular tissue from the leaves to such an extent that the foliage of whole trees and even of orchards is destroyed, and the trees are left apparently covered with only dead leaves. This injury, occurring as it does when the trees require the full use of their leaves to bring the fruit to perfection, is a serious one, and its effects last over and affect the crop of the second year. A second brood of larvæ appears in August and September. These, when fully fed, fall to the ground and penetrate a short distance beneath the surface, where they remain until the following year, changing to pupæ about the middle or end of May, and the flies emerge soon afterwards. The Pear-tree Slug, which, as its latin name indicates, attacks also the Cherry-tree, is a very easy insect to control. In properly managed and sprayed orchards it can never be troublesome. Owing to the viscid secretion on the skin any dry, dusty material adheres to it and causes the insect great inconvenience; therefore, dusting trees with freshly slaked lime or even with finely sifted road dust, will have the effect of clearing trees of large numbers. Two or three applications should be made at short intervals. In hot, dry weather dusting trees either by hand or with an insect gun or other implement for the distribution of dry powders, for two days running, I have found quite satisfactory. The material used was freshly slaked lime, to which Paris green was added in the proportion of one pound to fifty, so that in case any of the larvæ, which might have been moulting, escaped, there would still be on the foliage poison to destroy them as soon as they began to feed. The most practical remedy is undoubtedly to spray trees with Paris green or some other arsenical insecticide, one pound to 160 gallons of water. This treatment will not only destroy the Pear-tree Slug but also many other kinds of leaf-eating insects.

The Pear-tree Flea-louse (*Psylla pyricola,* Foerster).—Although up to the present time the Pear-tree Flea-louse, called also the Pear-tree Psylla, has not been the cause of widespread injury, still there are every year complaints of more or less serious loss in pear orchards in western Ontario. I have found this insect to be abundant when looked for in orchards, throughout the Niagara district and along the north shore of Lake Erie. During the last summer I have had it sent to me from two localities in Nova Scotia, and believe it to be also present at other places from which no specimens have been received. Prof. Lochhead, of the Ontario Agricultural College, writes me as follows :—

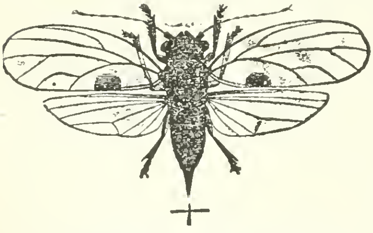
Fig. 18.—The Pear-tree Flea-louse : perfect insect—enlarged.

'This insect has been very injurious this past season, more especially in the Grimsby district.' A correspondent writes:—'When I came home on July 4, many trees were fairly covered with it. The insects were mostly wingless, with a few winged forms. They are found in the axils of the leaves, along the petiole and along the blade, but are chiefly found on the leaves a short distance from the vein or just in the axils of the secondary veins or mid-veins. In the first place, the tissue of the leaves dries up in spots where they are situated; but in the latter case they cause a drying of the tissues along the edge of leaf at the outer extremity of the vein. When the psylla is situated in the secondary axils of the leaf, the petiole seems yellowish in colour and the attachment to the stem seems weak. About July 15 to 25 the psyllas were most abundant—the number of winged forms increasing until the 25th. A heavy rain on the 23rd cleared the trees of the honey-dew, and seemingly of quite a number of the psyllas. After another heavy rain on the night of July 27, I noticed that there were very few of the wingless forms, but a great number of the winged ones. Up to this time very few leaves had fallen off, although the growth of the trees was completely stopped; in fact, our trees have apparently made no growth at all this year, excepting a few that were free from the Psylla. At the time of writing, August 27, the wingless forms have again become numerous and the winged ones few."—W. R. Dewar.

Mr. John Chute, of Berwick, N.S., also observed that those of his trees which were infested by the Pear-tree Flea-louse made no growth.

This insect was first noticed as injurious in Canada in 1894, and a short account of it, with the best remedies for controlling it, appeared in my annual report for that year. The attack may be described as follows:—Small clear-winged insects, wedge-shaped like miniature cicadæ, the head being broad, flat in front, and the body pointed behind; one-tenth of an inch in length, of a reddish brown colour, with broad black bands across the abdomen. These insects, at the slightest disturbance, leap from the foliage of infested pear trees and fly for a short distance. With the above described form, there will be found on the leaves the curious flattened oval larvæ, which, when first hatched, are extremely small, only one-eightieth of an inch in length, of a semi-translucent yellow colour, with bright red eyes. These grow rapidly, and in about a month pass through five nymph stages, during which the body retains its flattened form and becomes much darker until, in the full-grown nymph, the large wing-pads and the greater part of the upper surface are black. The eyes and sometimes the body between the black markings are crimson. The presence of this insect upon trees is easily detected by the copious secretion of honey-dew with which the leaves, limbs and trunks of the trees soon become covered, and upon which the dirty looking Sooty Fungus *(Fumago salicina)* develops. After a time the leaves and young fruit fall off and the trees assume an unhealthy, gnarled appearance. Hardly any new growth is made, and in cases of severe attack, trees die.

The life-history of this insect has been carefully worked out by Prof. Slingerland, of Cornell University, and has been fully described in Cornell Bulletin No. 108, published in 1896, as well as in U. S. Div. of Ent., Circular No. 7, 2nd series, by Mr. C. L. Marlatt.

The remedies for this insect are the spraying of the trunks of trees which are known to have been infested, during the winter or early spring, with kerosene emulsion, whale-oil soap solution, or whitewash. This is to destroy the hibernating adults, which pass the winter hidden away beneath flakes of bark or in crevices.

The eggs are laid very early in spring long before the leaf buds expand. After leaving their winter quarters and after the sexes have mated, the females lay their curious pear-shaped and tailed eggs (fig. 19) near the tips of the young wood. The young flea-lice hatch from these about the middle of May or sooner, and immediately begin sucking the sap from such leaves as have unfolded. Mr. Joseph Tweddle, of Fruitland, Ont., tells me that he obtained very satisfactory results in destroying the Pear-tree Psylla in orchards which he had sprayed with the lime and sulphur wash to control the San José Scale. He was under the impression that the mixture destroyed the egg upon the young wood, which is highly probable. It frequently happens that fruit growers do not know of the presence of this enemy in their orchards until they notice their pear trees becoming dirty and black during June, or a little later in the year notice that the leaves are falling. As soon as the insect is noticed in sufficient numbers to cause injury to the trees, these

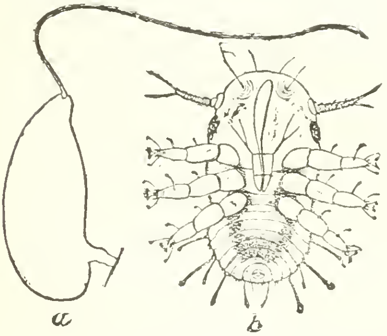

Fig. 19.—Pear-tree Flea-louse: *a*, egg; *b*, larva—both greatly enlarged. (Marlatt, U.S. Dept. of Agriculture.)

latter should be sprayed at once with the ordinary one to nine kerosene emulsion or with a whale-oil soap solution of one pound to six gallons of water. This will destroy large numbers both of the nymphs and also of the mature insects. The most effective work, however, is done during the winter, when nearly all of the adults resort to the trunks and larger limbs for hibernation. In my report for 1900, at page 239, I drew attention to some good work which had been done by Mr. Henry Lutz, of Youngstown, New York State, by spraying with a lime wash. In 1896 a large Duchess orchard belonging to him was almost ruined. In February, 1897, the whole orchard was thoroughly sprayed with whitewash, and two years afterwards this orchard was almost free from Psylla. Mr. Lutz explains his plan as follows:—'During the cold weather in December we spread a canvas under the trees and then scrape off all the rough bark. This dislodges many of the torpid insects, which are burnt with the scrapings. We then give the trees a thorough coating of slushy whitewash made of freshly slaked lime that had been run off in a putty state, as masons usually make it for plastering. We thin this with skimmed milk and put it on the trunks of the trees with a brush, for those parts of the tree which we can reach. We thin down the whitewash with more milk and then give the whole tree a thorough spraying. In this way we destroy a large number of the hibernating Psyllas, and those which are not killed are so well sealed up that they cannot get out to lay their eggs. We spray again in March to coat the wood and buds, so that the few that are alive can find no favourable places to lay their eggs. The orchard where we experimented contained 1,000 trees, which were practically worthless, but since we began using the lime the trees have steadily regained their vigour.'

The PEAR-LEAF BLISTER-MITE *(Phytoptus pyri,* Nalepa).—This enemy has now spread to every part of the Dominion where pears are grown. Specimens were sent from Prince Edward Island by Mr. E. J. McMillan, the secretary of Agriculture for that province, and within the same week in June specimens came in for report from the provinces of Quebec and Ontario. Mr. E. P. Venables, writing from Vernon, B.C., says:—'Pears suffered from the attacks of the Pear-leaf Blister-mite. This insect threatens to become a very serious enemy unless measures are taken to subdue it. I found that the lime, sulphur and salt spray was very useful in destroying it. It was applied just before the buds burst. One tree upon which the leaves were simply black with the work of the mite, was treated thoroughly and the following year was practically free from the insect. A few branches at the top of the tree, however, were as bad as ever. These had not been reached by the spray.'

Frequent experiments have shown that the best treatment for this pest is spraying the trees thoroughly with the lime, sulphur and salt wash just at the time the buds are bursting. The mites pass the winter hidden away securely beneath the bud-scales, which by the expanding of the buds in spring are opened up sufficiently to allow the entrance of liquid. Kerosene emulsion is useful to a certain extent, but sulphur has a specially fatal effect on all mites, and in practice the wash above mentioned has proved the best remedy against the Pear-leaf Blister-mite. See below for receipt of lime and sulphur wash at page 199.

## THE SAN JOSE SCALE *(Aspidiotus perniciosus,* Comstock.)

This notorious insect has done much harm in Ontario orchards during the past season. The only part of Canada where the San José scale is now found as an orchard pest is in the Niagara peninsula and in the counties along the north shore of the western end of Lake Erie. The infestation has, however, decidedly increased a great deal during 1903, and has involved new orchards within the area known to be infested at the end of 1902. It is a matter of congratulation that the pest has not spread beyond those limits; for, although most of the leading fruit-growers seem to understand the danger of neglecting this terrible pest, yet there are many owners of small orchards who are doing nothing whatever to save their trees, and these centres are sources of public danger. An interesting occurrence of the small parasitic beetle *Pentilia misella*, Lec., was brought to my notice by Mr. W. O. Burgess, of Queenston, Ont. This useful little coccinellid was found in some abundance on apple and plum trees infested by the San José scale. It is a well known parasite of that scale insect, and although it has on several occasions been found in considerable numbers in infested orchards, I have never been able to see that it affected the abundance of the scales appreciably.

The Minister of Agriculture still maintains the fumigating stations at Vancouver, B.C., Winnipeg, Man., Windsor and Niagara Falls, Ont., St. Johns, Que., and St. John, N.B.; and a great deal of nursery stock has been passed through them during the past season. A rigorous watch has been kept on every kind of nursery stock which could possibly bring in fresh importations of the San José Scale, and I have again this year the greatest satisfaction in reporting that no single instance has been brought to my notice of living scales having been detected on trees which had passed through the fumigating houses. The superintendents at all of the stations have done their work carefully and well, and no complaints have been received from importers, either as to the slight delay which must occur while the stock is being treated, or as to any injury to the trees during the necessary unpacking, handling and repacking. Careful experiments have shown that the formula used at our federal fumigation stations is thoroughly effective in killing the San José Scale, and does not in any way injure the stock submitted to the gas. The formula used is one ounce of cyanide of potassium (98 per cent), one ounce of commercial sulphuric acid and three ounces of water—exposure, 45 minutes.

During 1903 the experiments which had been carried on up to that time by the Ontario government to discover a practical remedy for the San José Scale were discontinued. After having demonstrated by the excellent work and most careful experiments of Mr. Geo. E. Fisher that this insect could be controlled by practical measures, the Provincial Minister of Agriculture considered it wise not to carry on these experiments any longer. Consequently, during the past summer, although helped with advice and publications by the Provincial Department of Agriculture and Prof. W. Lochhead, of the Guelph Agricultural College, fruit-growers have had to attend to this part of their work themselves. Some have applied the recommended measures and have been quite successful in their efforts when the work was done thoroughly, but the scale has increased to an alarming extent during 1903. The consensus of opinion is that when the well known lime, sulphur and salt wash, or the recent modification of it, in which the salt is omitted, is applied thoroughly as a late winter wash, it is a safe and reliable remedy for the San José Scale. It kills by contact with the scale and acts mechanically by coating the trees so that they are unsuitable for the young scales to establish themselves upon. This wash is used as a winter wash, and should be followed in summer with sprayings of the 1 to 6 kerosene emulsion. The preparation, as described in previous reports and as used to-day in many places, consists of about one pound of lime, half a pound of sulphur and six ounces of salt to every gallon of water in the wash when ready for use. Mr. G. E. Fisher, who tried an enormous number of experiments, found that the results of his investigation justified him in recommending that the salt might be omitted without loss of insect killing power. The original formula of the California wash is :

LIME-SULPHUR-SALT WASH.

| | |
|---|---|
| Lime, unslaked | 40 lbs. |
| Sulphur | 20 " |
| Salt | 15 " |
| Water | 60 gallons. |

The chief difficulty in making this wash has been the expense and inconvenience of boiling it for two or three hours, so as to thoroughly dissolve the sulphur. This may be done either directly over the fire in iron kettles or in barrels by means of a jet of steam. Mr. G. E. Fisher describes his method of preparing this useful wash on a large scale, as follows:—

'There are a great many ways of preparing lime and sulphur wash for spraying, and nearly every one who does it prefers his own way. When large orchards are to be treated, it is not practicable to cook the material to be used, by boiling it in kettles over the fire. In my practice I found that, with the aid of steam from an ordinary threshing engine, this most effective spraying material could be supplied in large quantity perfectly cooked and at a cost of from one cent to one and a half cents per gallon. A 12-horse power boiler will not furnish steam enough to cook 12 barrels at once, without extra heavy firing, and, with ordinary firing, such a boiler will not properly run more than 8 or 9 barrels, which will cook probably about 1,200 gallons of spraying material in 10 hours. The greatest drain upon the steam is in starting, when the water is all cold, and, to expedite matters and get some of the barrels under weigh, I found considerable advantage in starting about one third of them. We fill four barrels one-quarter full and then turn on the steam. With steam at from 80 to 100 lbs. pressure, these will be boiling in five minutes, when the steam is turned off these and on to four more barrels, and all the lime and sulphur are put into the first four as quickly as possible without making them boil over. It is best to turn off the steam while the lime is being slaked, as it lessens the danger of making the mixture boil over. When the lime is all slaked, the steam is turned on again and the mixture is left boiling until cooked. When the second four barrels are boiling, the steam is turned on to the third lot as with the first two, always returning the steam to the barrels as soon as the lime is all slaked. Managing in this way, we always had some material ready for use. That which is prepared late in the evening will still be warm enough in the morning, even in cold weather. In order to make up for the loss of liquid from boiling and to gradually fill the barrels to the proper depth, a small stream of cold water was kept dribbling into them at a rate which allowed the barrels to fill in the course of the two or three hours' cooking necessary to reduce the sulphur. In this way the mixture was kept boiling all the time and the necessary amount of liquid was added. For boiling the mixture in the barrels, we have a quarter-inch pipe which reaches down to within four inches of the bottom of each barrel, and each pipe is provided with a stop-cock.'

'When using a kettle, if I have only one, it is filled about one-third full and brought to a boil. The lime and sulphur are then added, and an old tin pail with a small hole in the bottom is hung over the kettle, and cold water dribbling from it into the kettle replaces the water which evaporates with boiling and increases the quantity. When kettles are used, if there are two, one may be used for heating water; for, while the mixture is cooking, cold water should not be added in sufficient quantity to check the boiling. I have generally slaked the lime in the barrels or kettles as it was required, but on some occasions we slaked it in another barrel by throwing boiling water over it and with just as good results. We certainly got our best results where each gallon of the wash contained one pound of lime and half a pound of sulphur, which we cooked from two to three hours. It is true Dr. Forbes got his wonderful results from a less quantity cooked one and a quarter hours. Mr. Pease, the California Scale Inspector, says it must be cooked at least three hours and that more cooking is better. He believes that this wash is of little use unless sufficiently cooked. We had good results and perhaps should be satisfied, but I think we have good reasons for using the larger quantity of material and cooking a long time. In Michigan again they used less material even than Dr. Forbes. A very common proportion in the United States is 40 lbs. of lime, 20 lbs. of sulphur, 15 lbs. of salt, in 50 imperial gallons of water.'

Dr. S. A. Forbes, who has been very successful in fighting the San José Scale, uses the Oregon wash and is quite satisfied with it. Writing at the end of the season of 1903, he says: 'I am still using the ordinary Oregon wash of 15 lbs. of lime, 15 lbs. of sulphur and 1½ lbs. of blue vitriol, dissolving the lime and sulphur by boiling for about an hour and then adding the blue vitriol, which has been dissolved in hot water, and boiling for 15 or 20 minutes longer.'

Mr. W. H. Owen, who has done a great deal of work against the San José Scale, on Catawba Island, Ohio, and has tried all of the different remedies which have been suggested from time to time, wrote me recently: 'In 1903 the original California formula was somewhat modified. The quantities of the new formula being lime 15 lbs., sulphur 15 lbs. and salt 15 lbs. to the 50 gallons of water, and this gave equally good results with the old formula. The Oregon wash of 15 lbs. of lime, 15 lbs. of sulphur and 1¼ lbs. of blue vitriol, is what I used during the past season, and I cannot expect to find anything that will do better work than this, both on the San José Scale and the Leaf Curl. When properly made it surely is a perfect insecticide and fungicide. Too much stress cannot be laid upon proper making; for I believe that failure in obtaining satisfactory results can in most cases be traced to careless making.'

The lime-sulphur-and-salt wash, as made in the old method by boiling for a long time, is very fatal to scales, and many other kinds of insects, and there has been a constant effort made to see if the long boiling cannot be avoided. The point aimed at is to dissolve the sulphur thoroughly by means of the lime and heat, and to form a double sulphide of lime. There is an excess of lime in all the formulas used, but this is in no way detrimental. The mixture, however, is not a pleasant one to use, being caustic if it gets on the bare flesh, and is very destructive to clothes of workmen using it. For this reason old clothes should be worn and the hands should be protected with gloves. It must only be used as a winter wash, for if of sufficient strength to destroy the scale, it would injure foliage as well as sensitive stock in autumn before the buds are dormant; but, when buds are quite dormant, it may be used upon all fruit trees and other hard-wooded plants liable to infestation by the San José Scale. Its effectiveness has been proved by several, and one instance which has been seen by many of our Ontario fruit growers, is the case of some plum and peach trees in the orchard of Mr. W. W. Hilborn, at Leamington, Ont. In the spring of 1903, Mr. Hilborn found that a small block of trees was badly infested with the scale. He at once procured a plant for making the lime and sulphur wash and sprayed the trees thoroughly. These trees were examined by me with great care on November 25 last, and I could not find a single living scale. All experimenters recommend that this wash should be applied while it is hot; but, as a matter of fact, this is seldom done in practice, although those who have used hot or warm wash will notice how much more convenient it is to spray when in this condition, and it certainly is more effective in killing the scale.

A simple formula for making this wash in small quantities is 1 lb. lime, ½ lb. sulphur, and 3 gallons of water.

### THE NEW LIME-SULPHUR-SODA WASH.

The chief difficulty in making the wash has been the expense and inconvenience of boiling it for such a long time, to thoroughly dissolve the sulphur, and several of our fruit growers have inquired for information concerning some experiments which have been mentioned in the agricultural press and which were undertaken to dissolve the sulphur with caustic alkali and lime, instead of the troublesome and lengthy boiling. These experiments originated with Professors Victor Lowe and P. H. Parrott at the New York Agricultural Experiment Station, Geneva, N.Y., as set forth in the Station Bulletin No. 228, 1902, and consisted of dissolving the sulphur by means of caustic soda or caustic potash in addition to the lime. In making the wash, 40 lbs. lime were slaked in hot water, using only enough water to make it boil rapidly, and while slaking 20 lbs. of ground sulphur, which has been made into a thin paste, is added and thoroughly mixed with the slaking lime. Five pounds of caustic soda in solution is then poured in with more water as needed, and the whole is stirred thoroughly. As soon as chemical action has ceased, hot water is added to make the wash up to 60 gallons, and the mixture is then ready for immediate use. In making the above wash, it was found that to secure the proper chemical action the quantity could not be reduced lower than: lime 4 lbs., sulphur 2 lbs., and caustic soda (the ordinary concentrated lye of commerce) ½ lb., water 6 gallons. The rule is to use one-quarter of a pound of caustic soda, or potash, to each pound of sulphur. With the exception of heating the water, the whole of the cooking of this wash can be done in a half barrel, and takes from ten to twenty minutes. From the ease with which this wash can be made and from the fact that Mr. Parrott tells me that, although 'the results upon the scale differed with different lots of the mixture, some of the applications were entirely satisfactory,' I believe it is well that several people should try this method of manufacture. The trouble of making the lime-sulphur-and-salt wash has certainly prevented the use of such a valuable mixture to a large extent. I regret to say that my own work with it did not begin soon enough for me to report upon it now. I can merely say that the lime and caustic potash do dissolve the sulphur and that the appearance of the wash is what it ought to be.

Mr. F. T. Shutt, the chemist of the Dominion Experimental Farms, has kindly carried out some test preparations by this convenient new method of making the wash and has handed me the following resumé of his work:—

## *ON A NEWLY-PROPOSED METHOD OF PREPARING THE LIME-SULPHUR WASH.*

(By Frank T. Shutt, M.A., F.I.C., F.R.S.C.)

In the report of the Division of Chemistry of the Experimental Farms for 1902, the results of a series of experiments in the preparation of the lime, sulphur and salt wash by boiling, are given. Since the appearance of that report a method has been proposed by the New York (Geneva) Experiment Station, which obviates the necessity of boiling—the chief drawback to the more common use of this valuable remedy. The modification consists in the addition, at a certain stage in the preparation, of strong lye, such as Babbitt's or Gillett's. The proportions and preparation as given in Bulletin No. 228 of the above named Experiment Station are as follows:—

| | |
|---|---|
| Lime (unslaked) | 40 lbs. |
| Sulphur (ground) | 20 " |
| Lye, concentrated | 5 to 10 " |
| Water | 60 gallons. |

'In the preparation of the mixture the lime was slaked, preferably with hot water, and while it was slaking vigorously, the sulphur, which had been made into a thin paste, was added and thoroughly mixed with the slaking lime. The caustic soda was then added, with water as needed, and the whole stirred thoroughly. As soon as the chemical action has ceased, the required amount of water, preferably hot water, is added, and the mixture is ready for use.'

It will be noticed that in this process there is no boiling and no salt, an ingredient in the old formula which apparently had no direct value, but was useful in raising the boiling point of the mixture, thus ensuring a more complete union of the sulphur and lime.

At the request of the Entomologist (Dr. Fletcher), we made several trial preparations in the laboratory and found that the proposed method is quite workable and simple, and yields a product in which there is *very little uncombined sulphur.* This latter is an essential point, as undoubtedly it is the sulphur compounds that give this wash its great value for destroying the scale. It is necessary to this end that the sulphur be added (in a thin paste) while the lime is still actively slaking—for which purpose care should be taken to use only a sufficiency of water—and the mass stirred vigorously. As soon as the sulphur paste is poured on to the slaking lime, add the solution of lye, with such further quantities of water as may be necessary, stirring and mixing, until all bubbling ceases. There is now an orange-yellow, pasty, homogeneous mass, which can be diluted to the requisite volume, either at once or at any subsequent time, if kept out of contact with the air.

As far as one can judge from what might be called the chemical or physical point of view, this wash should prove equally effective with that prepared by boiling.

F. T. S.

In an excellent bulletin just issued by Prof. J. B. Smith, of New Jersey, entitled 'Insecticides and their use,' this lime, sulphur and soda wash is mentioned and some valuable suggestions are made. Prof. Smith says: 'This wash has been found quite effective, but it is not so good as the boiled mixture, and costs a little more.' He also draws attention to the fact that warm water must be used as well as a good quality of stone lime and of caustic soda, and further that it must be remembered that a can of lye does not equal a pound.* He further states that 'all these combinations of lime and sulphur are more or less unstable and sooner or later the lime settles and the sulphur forms long spicules. When this occurs, the mixture is ineffective in proportion as the sulphur has become separated out. The best boiled combinations become useless in forty-eight hours, and in all cases the wash is most effective just after it is made.'

The above extracts from Prof. Smith's bulletin indicate the importance of using the lime and sulphur washes while fresh; but the statement that 'the best boiled combinations become useless in forty-eight hours,' is probably too sweeping.

A point upon which too much stress cannot be laid is the great importance of washing out thoroughly all pumps and hoses used for spraying caustic or corrosive insectide and fungicide washes.

## FOREST AND SHADE TREES

Forest insects and those which attack shade trees in cities, have been, on the whole, less injurious than usual during the past season. There were, however, one or two outbreaks which require mention. The White-marked Tussock-moth has increased very much in the cities of Toronto, Montreal and Kingston, so much so that remedial measures are now urgently needed, or the beautiful shade trees in those cities will suffer irreparably at no distant date. Something has been done in the past by the city authorities to control this insect, but of late years they seem to have relaxed their efforts, and the insect is increasing in numbers. A remarkable outbreak of the Maple Soft Scale (*Pulvinaria innumerabilis*, Rathvon) occurred on shade trees in the cities of London, Woodstock and Hamilton, as well as in other places in south-western Ontario. The well known Fall Webworm (*Hyphantria textor*, Harr.), which for some years has been occurring only in small numbers, during the last season increased sufficiently in most parts of the Dominion to attract general attention. The unsightly webs were very conspicuous in British Columbia and in many places in Ontario and Quebec. The webs of the caterpillars are so easily seen that this insect, if attended to, can be controlled with comparative ease, by spraying the trees with poisonous applications or by cutting off the webs, each of which contains a whole colony of

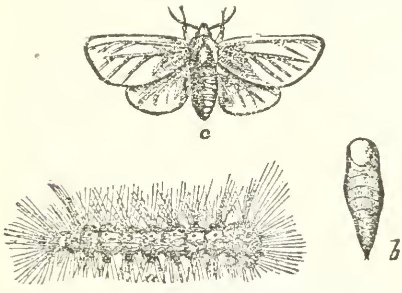

Fig. 20.—The Fall Webworm: *a*, caterpillar; *b*, pupa; *c*, moth.

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*The contents of several cans of concentrated lye which were examined here in no case quite came up to 1 lb. avoirdupois.

caterpillars. This must, however, be done before the caterpillars reach full growth, or the work is useless. I have known of one instance where a municipal body with all good intentions employed a man to cut out all of the webs of this insect and those of the Tent Caterpillar in winter time, under the supposition that by this means they were controlling those enemies. It is true the trees were more sightly when these nests had been removed; but the operation in no way affected the abundance of the species the following summer, because the caterpillars only live in the nests until nearing full growth, when they leave them and pupate or build their cocoons in other places. The Tent Caterpillars pass the winter inside the eggs, which may be found on trees, and the Fall Webworms as pupæ buried in the ground. Prof. Lochhead reports 'that the Fall Webworm was very abundant in western Ontario late in summer, not only on shade trees, but on many kinds of fruit trees, and unquestionably did considerable harm. On account of the scarcity of labour in rural sections, few attempts were made to get rid of the ugly webs filled with caterpillars. Unless parasites thin them out very much, there is every likelihood that the Fall Webworms will be very numerous next season.' The Negundo Plant-louse *(Chaitophorus negundinis,* Thomas) was observed as injuriously abundant in Winnipeg, Regina and Calgary, the shade trees, which are largely Ash-leaved Maples, being much disfigured by the copious deposit of honey-dew on the leaves, and the Sooty Fungus which grows upon it. These trees attracted swarms of flies during the daytime and of moths at night. The remedy recommended for clearing these trees was to spray them with kerosene emulsion, 1 to 9, or whale-oil soap, 1 pound in 6 gallons of water, with or without tobacco. The tobacco, however, adds considerably to the killing value of the wash. The Spruce Gall-louse *(Chermes abietis,* L.) has spread widely through the Dominion, and has been the cause of a good deal of injury to spruce trees. In the forest, nothing can be done to check the spread of the insect; but in the case of ornamental trees, good results have followed spraying with a tobacco and soap wash. The Fall Cankerworm was very abundant and destructive in the woods around Ottawa early last spring. The caterpillars were not quite full grown on June 12 last, when the first heavy rains came, which broke the exceptional drought which up to that time had prevailed throughout eastern Ontario. Previous to that they had been literally swarming in many woods along the Ottawa river. After the rains they suddenly disappeared, and the total absence of both male and female moths in the woods in autumn was noticed by many. It is possible, therefore, that there will not be a recurrence of this attack for some time. The Birch Skeletonizer *(Bucculatrix canadensisella,* Cham.) did some harm to birch trees of all kinds again last year in eastern Ontario. The attack, however, was not nearly so severe as in the two previous years, nor was its work supplemented by that of the large aphis, *Callipterus mucidus,* Fitch, and the small green leaf-hopper, *Empoasca smaragdula,* Fall., which for the last two years have perhaps done as much harm to trees on the Central Experimental Farm as was done by the *Bucculatrix* caterpillars. On my return to Ottawa on August 21 last I found the birch trees on the ornamental grounds of the Central Experimental Farm attacked in some places by the Birch Skeletonizer to such an extent that some trees looked about half clothed with foliage. These were at once sprayed with a whale-oil soap and tobacco wash, which was quite effective, and no further injury was done. Should this insect again occur, trees should be examined in July and early August, and, if the small caterpillars or the round white pseudo-cocoons in which the caterpillars pass their moults are seen in numbers, the trees should at once be sprayed before the foliage is injured to a conspicuous extent.

## THE WHITE-MARKED TUSSOCK-MOTH

[*Hemerocampa (Orgyia) leucostigma*, S. and A.]

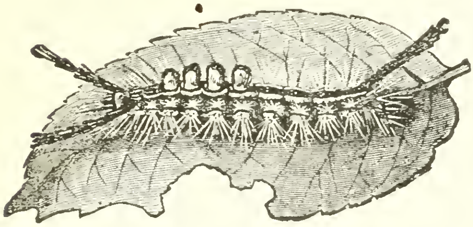


Fig. 21.—The White-marked Tussock-moth : caterpillar.

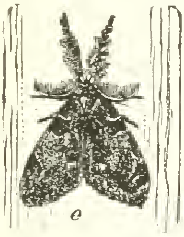


Fig. 22.—The White-marked Tussock-moth : male moth.

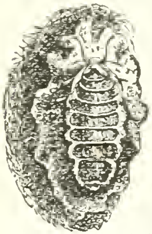


Fig. 23.—The White-marked Tussock-moth: female moth.

*Attack.*—Slender, sparsely hairy caterpillars, from one and a quarter to one and a half inches in length, blackish above and paler beneath, with two bright yellow stripes along the back, most conspicuous towards the end of the body. There are four short brush-like tufts of whitish hairs on segments 5, 6, 7 and 8. The head chestnut red ; a large patch on segment 2, and two small glandular spots on segments 10 and 11, bright vermilion red. From each side of segment 2, close behind the head, are long plume-like tufts of black, barbed and knobbed hairs; a similar plume ornaments segment 12. When full grown these caterpillars have a decidedly handsome appearance, which is well represented in the accompanying figure. The male moth measures about an inch and a quarter across the wings, and is marked as shown in Fig. 22. The colour is gray and the wings are crossed by wavy bands. The base of the fore-wings bears a dark patch, and there is another of smaller size towards the tip. The popular name is given to this moth from the presence of a small white spot near the outer hind angle of the fore-wings. The female is a large-bodied wingless pale gray creature, with only rudiments of wings. On emerging from the cocoon she crawls on to it and seldom moves from it. After pairing, she lays a mass of eggs, from four to five hundred in number, generally on the outside of her cocoon, and then dies there. These eggs are covered over as laid with a white frothy fluid, which dries over the eggs and protects them through the winter. There is in Canada only one annual brood of this insect. The eggs may be found during the winter on the trunks of trees upon which the caterpillars had fed the previous season. The young caterpillars emerge from the eggs at the end of May or early in June, and soon crawl up and distribute themselves throughout the foliage of the trees, feeding at first beneath the leaves, and when disturbed letting themselves down by a slender silken thread. By the middle of July the caterpillars have for the most part become full grown and are preparing to spin their cocoons. As they increase in size, they become very ravenous and strip entire trees, eating the cellular tissues between the veins of the horse chestnut leaves, which appears to be the favourite food plant, and producing a characteristic injury, which is easily recognized. These caterpillars have a habit of wandering from branch to branch and from tree to tree, which has given rise to the practice of banding trees with strips of cotton batting. This gives a very untidy appearance to streets and does not do very much good, certainly not enough to atone for the unsightly appearance of the trees. The most effective remedies for the White-marked Tussock-moth are (1) the collection of the conspicuous egg masses from the trunks in winter or before they hatch in spring. This may be easily done by means of a small wire brush on the end of a long pole which will reach up among the larger branches of the trees. Such a brush as this was devised by the late Alderman Hallam, of Toronto, and used to good effect on the city shade trees during a previous outbreak of this insect. (2) Undoubtedly the best remedy is the systematic spraying of shade trees with some arsenical poison as soon as the young caterpillars hatch from the egg, or as soon afterwards as possible. This work, if properly done, will destroy every caterpillar and render unnecessary the collection of the eggs in winter and the use of unsightly tree protectors, bandages of cotton batting, or sticky substances, all of which are more costly and objectionable. It might be well to point out that, when municipal bodies adopt the plan of collecting the cocoons in winter, it would be well to place these for a time in some place where any parasites which might be passing the winter in the cocoons could emerge and escape, but where the young caterpillars upon emerging would find it impossible to gain access to any trees. This might be done by putting them in an upper room of some building from which the parasites could fly out of the windows, but from which the young caterpillars could not crawl to trees which would serve them as food. Deprived of food, they will soon starve after leaving the egg.

## THE APIARY

The Apiary, as in the past, has been under the management of Mr. John Fixter, the farm foreman, whose report I append herewith. The same experiments which have been carried on for some years have most of them been repeated on account of the large amount of interest which has been evinced in the subject by correspondents and visitors to the Central Experimental Farm. The services of Mr. Fixter have been asked for at a great many meetings of bee-keepers, and, whenever his duties at the Central Experimental Farm would permit of it, he has attended these meetings and given addresses.

### *REPORT OF MR. JOHN FIXTER.*

The season of 1903 has been a poor one in the Ottawa valley, but in the greater part of western Ontario the crop has been excellent both as to quality and quantity; parts of the province of Quebec also report good crops, principally where Bokhara clover grows extensively; also in districts which had sufficient moisture in the spring.

The season opened very early; the colonies were set out on their summer stands on March 21. The temperature on that date being 48; and the day bright and mild was most favourable for the cleansing flight of the bees. Then followed several days of cool windy dull weather, which kept the bees confined to their hives; this continued all the rest of March. April was also very unfavourable, being cool and windy. During the greater part of the latter month there was only about three-quarters of an inch of rain, all growth and bloom being thus kept back. May set in warmer; the bees gathered pollen freely, and built up fairly well. It was necessary to feed the bees during May to keep up brood rearing. Only about a quarter of an inch of rain fell during May, and up to June 8 the land was so dry and hard that no clover of any account came in bloom. After June 8, abundance of rain fell, many flowers appeared, and the small amount of surplus honey was gathered after that date. Swarming was light owing to the poor season. There being no fall honey flow from any source all supers were removed on August 26.

On September 1 all colonies were weighed; any that did not weigh 50 pounds and over were fed. When feeding, care must be taken not to feed weak swarms, but the strong ones; then, when these have filled the frames these latter should be given to the weak colonies: otherwise the weak colonies are liable to get robbed. A much better plan of bringing colonies up to the required weight is, in the extracting season, to save some of the well-sealed combs to fill up the light colonies with them. There is then very little danger of their being robbed.

On November 24 all colonies were weighed and found to be in good condition. They were then put into their winter quarters.

Returns from the Experimental Farm apiary averaged 23 lbs. per colony.

Meetings were attended during 1903. The Ontario Bee Keepers' Association at Barrie and Trenton; also farmers' and beekeepers' joint meetings at the following places: Manotick, North Gower, Stittsville, Richmond, Malakoff, Lanark, Wellman's Corners, Bell's Corners, Jockville, Carp, Kinburn, Smith's Falls, Leonard, Metcalf, Balderson and Innisville, in Ontario; Grenville, Lachute, St. Andrews, Como, Buckingham and Templeton in Quebec.

### INSULATING HIVES FOR OUTSIDE WINTERING.

Two colonies of equal strength with good laying queens in Langstroth hives were taken for this experiment. The hives were insulated against the winter cold by air cushions in the following manner:—

Slats 1 inch thick are nailed at intervals all round the hive, on these is packed one layer of thick brown building paper and then a layer of oiled paper, which increases the durability and keeps out vermin. In order to provide extra protection to the hive, a box six inches wider and six inches longer was placed over it with an opening cut at the entrance 1 inch by 2 inches, all other openings being closed.

The wooden cover of each hive was removed and replaced with a chaff cushion 3 inches thick, the latter placed on the propolis quilt, and lapping over the sides of the hive; two layers of paper were then placed on the top of the cushion and a second cushion added, with the top of the outside box over it. The bees were put into winter quarters on November 18, 1902. No sound could be heard from those colonies all winter, up to March 10, when a slight hum was perceptible. On March 20, 1903, the first bees made their appearance; there were many dead bees at the entrance of the hives. On March 21, the outside cases were removed, leaving the paper and one chaff cushion on during the cold spring. Upon examination one colony was found to be in fairly good condition, the other very poor, with many dead bees on the bottom board. A few days afterward the latter was found to be deserted. The frames in both cases were all dry and clean and had abundance of honey to carry them through from November to the clover bloom. Weight, when put into winter quarters, 53½ lbs. each; in spring, 37½ pounds each. Owing to the cool, backward spring, the surviving colony did not build up until May 1, when warmer weather set in; the bees at once began gathering pollen and built up very rapidly. The colony was in excellent condition for a honey flow, but during May and the early part of June the weather was very dry and warm, keeping all bloom backward; the bees, therefore, made but little surplus honey.

This experiment is to be tried again this winter.

### EXPERIMENTS TO TEST WHETHER DAMPNESS OR MOISTURE WOULD BE INJURIOUS TO BEES IN THEIR WINTER QUARTERS.

Three colonies were selected for this experiment, all of about equal strength, and all in Langstroth hives, weighing on an average 55½ pounds each. The wooden covers were removed from the hives and replaced with propolis quilts: the bottom of each hive was loosened from the brood chamber and a block two inches square was placed at each corner between the bottom board and the brood chamber, insuring free ventilation from the bottom of each hive. Four pails of water were then put on a table in such a way that the three hives were set resting on the edge of the pails, allowing the full surface of water to be exposed. The cellar was kept at a very even temperature of 42 to 48 degrees, and was well ventilated during the whole winter. The bees could be seen hanging below this frame in a quiet cluster, and there were very few dead bees on the bottom board, and no signs of dysentery.

On March 22, the day being fine, the colonies were removed to the bee yard, where all began flying at once. Average weight of the three colonies when set on their summer stands, 43¼ pounds each. From March 22 to May 1, the weather, although bright, was cool and windy, and very little flying took place. After May 1, the weather became considerably warmer, and the bees began building up rapidly. They were in excellent condition by May 24.

### EXPERIMENT IN FEEDING BEES IN THEIR WINTER QUARTERS.

Many letters have been received from people who have only a few colonies of bees, stating that when carrying their bees into winter quarters they had discovered there did not seem to be a sufficient store of honey in the hive to carry the bees through the winter. To gain information as to the best method of overcoming this difficulty the following experiment was tried with six strong colonies of bees:—

Four frames of sealed honey were taken from each of the six hives, leaving the cluster on the four remaining frames. The four frames were left in the centre of the hive with a division board at each side, and some light packing placed between the division boards and the sides of the hives. The wooden covers were removed and replaced by large propolis quilts made of heavy canvas. Over the top of the propolis quilt extra packing was added to keep in the heat, absorb moisture and prevent draughts or upward ventilation. The bottom boards were left on as they came from the bee yard, leaving the entrance wide open. The experiment was made as follows:—

1. Two colonies received maple sugar of the best quality.
2. Two colonies received partly filled sections of honey.
3. Two colonies received candied honey and sugar.

Each colony when put on this test, weighed 31 pounds, and each was given 5 pounds of its respective food to start with. The experiment lasted from November 18, 1902. to March 22, 1903. The two colonies fed on maple sugar consumed 11½ pounds each, they were examined every two weeks and water added to the sugar through holes in the tops of the cakes, keeping it soft and moist.

The two colonies fed on partly filled sections of honey, consumed during the same time 14¾ pounds each. There was for several reasons considerable waste in this test; consequently if partly filled sections could be sold even at a reduced price it would be advisable to sell them instead of feeding back.

The two colonies that were given candied honey and sugar consumed 10¾ pounds each. The candied honey was moistened from time to time, which made it easier for the bees to suck it up. Candied honey is made as follows: Take good thick clover honey, and heat (not boil) it until it becomes very thin; then stir in it fine granulated sugar. When the honey has dissolved the sugar, pour it into another vessel, and, when it has cooled sufficiently, thoroughly knead it with the hands. The kneading makes it more pliable and soft, so that it can take up more sugar. The kneading operation, with the adding of fine sugar, should be continued until the dough is so stiff as to be quite hard to work. It should then be allowed to stand for a day or two, and, if at the end of that time it is so soft as to run or to be sticky, a little more sugar should be kneaded in, so that it may be cut into cakes of a convenient size. These cakes are to be placed on top of the frames in such a way that the bees can get at them easily.

The colonies in all the three tests came through in excellent condition. Any one of the three methods may be safely followed, but I would strongly recommend examining and weighing all colonies the first week in September. At that time every colony should have a good laying queen, and should weigh over 50 pounds. In seasons when there is no autumn flow of honey, all colonies in Langstroth hives weighing less than 50 pounds in September should be fed up to that weight at least. The best method for getting colonies up to the required weight is, when the extracting takes place, to save several full well-sealed combs, then remove some of the light ones out of the hives and replace them with the heavier full frames. If no honey is available, feed sugar syrup. This plan is rather a tedious one and great care must be taken not to daub the hives or appliances, as robbing at this season of the year is very easily started and very hard to stop.

If the colonies that are short of stores are weak or feeble in number of bees, they should then be fed with syrup. In order to provide for them, feed the strongest colonies you have, for instance, by putting in their hives extra frames and feeding the syrup in a Miller feeder. A good strong colony will take down 10 to 15 pounds in a warm night. Continue the feeding until you have sufficient frames well sealed to make up the required weight. The full frames are then removed and given to the weak colonies that are short of stores; by this method there will be very much less danger of robbing, as the strong colonies are well able to look after themselves.

Sugar syrup may be made as follows: Use the best grade of granulated sugar, **two** parts to one of water by weight. The water should first be brought to a boil, then the pan or vessel set back on the stove so that the boiling will not continue but the water be kept sufficiently hot to dissolve all the sugar. The sugar should be poured in slowly and thoroughly stirred until all is dissolved. The syrup should then be fed in a lukewarm condition..

### FOUL BROOD.

Much attention has been drawn of late to this most destructive disease of bees, which affects particularly the larvæ or brood, causing them to die, mostly at the age of six to nine days. The disease is spread by bees feeding their larvæ with infected food, and is carried to new colonies by bees robbing diseased colonies. It is thought advisable to publish in this report the McEvoy method of detecting the disease and stamping it out when found in an apiary. With reference to this method of treatment of foul brood we have much pleasure in quoting the following from Wisconsin Beekeeping, Bulletin No. 2, 1902, by N. E. France, State Inspector of Apiaries.

'In Wisconsin I have tried many methods of treatment and cured some cases with each method, but the one that never fails, if carefully followed, and that commends itself, is the McEvoy treatment. It has cured foul brood by the wholesale, thousands of cases.' Mr. McEvoy decribes his method as follows :—

### THE MCEVOY TREATMENT.

*How to detect foul brood.*—When any dead brood is noticed in a hive, a sure way to ascertain whether the cause of death is the disease known as foul brood, is to put the head of a pin into a cell of a comb and draw it out; if the matter contained in the cell adheres to the pin's head and can be stretched about three-fourths of an inch, it is undoubtedly a case of foul brood. But every bee-keeper should be able to recognize the disease at a glance without having to use a pin, as above said; he should learn to know the stain mark of foul brood when he sees it. The manner of proceeding to examine an apiary in which foul brood is suspected, is as follows:

Before opening any of the hives give every hive in the vicinity a little smoke at the entrance. This will check the bees for a time from coming from other colonies to disturb you when you have a hive open to examine the combs. After taking a comb out to examine it, turn your back to the sun, and, holding the comb in a slanting position, let the light fall on the lower side and bottom of the cells; look there for the dark scales left in the cells and formed from the dried up, decayed bodies of the dead larvæ. Another sign of the presence of foul brood is that several of the cappings have a small hole in them, but this also appears in the case of cells containing brood killed by other causes than this disease.

[Mr. Charles O. Jones, of Missisquoi, Que., describes the symptoms of foul brood as follows in the Montreal 'Weekly Star' :—

'Of the diseases affecting the brood, the most serious is foul brood, which has appeared in some localities in Ontario in a virulent form, but is being successfully combated. The symptoms of this disease are not easily mistaken by one who is at all familiar with it. The brood hatches unevenly and the cappings have a shrunken appearance, and many of them are perforated as if the bees had begun uncapping the brood. The dead brood will be found adhering to the side (lower side) of the cell, and of a brownish colour. On inserting a small stick, the decomposed brood will adhere, and when withdrawn three-fourths of an inch, will still cling to the stick. Beside this "ropiness," the dead brood has a distinct odour very much like old glue. If the disease has developed sufficiently, this odour may be detected on removing the covering from the bees. These two last symptoms are peculiar to foul brood, and if present, are considered a certain indication of infection.']

### HOW TO CURE INFECTED APIARIES.

Every infected apiary should be treated according to the condition in which it is found, and at the same time not only to stamp out the disease, but also so as to induce considerable increase in the colonies, and end by having every colony in first-class condition. I may therefore first explain how I proceed. The best time for this work is while the bees are gathering freely during the honey season.

For this, taking two hives at a time, I shake off the bees from them with one of the queens, and give them a clean hive with foundation starters, leaving in the two original hives one queen and only about a quart of bees to take care of the brood still unhatched in those two hives. I now remove the bottom of one hive and the top of the other, and place the first on the top of the second, so that the bees may unite and, as the young bees hatch out, form one strong colony. By the time that most of the brood is hatched I have from the two colonies, when united, one large swarm of young vigorous bees. This swarm must then be shaken into a fresh clean hive with foundation starters.

I have now two first-class colonies, each containing a queen, one from the bees first shaken out of the two original infected hives, and another from the brood left in the original hives with a queen and a small number of bees to take care of it. Both of these colonies must now be treated to destroy the disease. All handling of diseased colonies, especially during warm days should be done in the evening, when no bees are flying. This will prevent robbing, and also will prevent bees from diseased colonies mixing with those from sound colonies, going into their hives with them. Again, by doing the work in the evening, it gives bees which have been treated a chance to settle and quiet down before the morning.

[Mr. Jones, of Missisquoi, explains the same treatment as follows:—

'The cure, although simple, requires great care to carry it out successfully. A clean hive containing frames with starters of foundation, should be placed on the old stand after removing the affected hive. Remove the combs from the affected colony, and shake the bees in front of the clean hive into which they will run. This should be done at nightfall, when the bees are all at home, and then there will be no danger of robbers getting at any of the tainted honey. Leave the bees in the new hive for at least four or five days, by which time they will have used all the honey they carried with them in comb-building, when you can remove the starters to melt into wax, replacing them with frames filled with sheets of foundation, and your cure is effected. I would advise burning the combs and honey removed from the hive and thoroughly disinfecting the hive by scalding before using again.

'Some authorities advocate caging the queen for ten days or so, to prevent brood rearing until all danger of infection has passed, but I consider this only as an extreme precautionary measure; in fact, hardly necessary.']

*Treatment during the Honey Season.*—When the bees are gathering freely, remove the combs from the hive in the evening, replacing them by frames with comb foundation starters, as said before; then shake the bees from the combs into a clean hive and let them build comb for four days. By that time they will have made the starters into combs, and will have stored in these the infected honey which they brought from the old combs. On the fourth day, in the evening, replace those combs containing the infected honey with full sheets of fresh comb foundation, and the cure will thus be complete. By this method of treatment, all the infected honey is removed before the full sheets of foundation are used.

When only a few cells are found with foul brood, after shaking off the bees for treatment, two hives may be filled with the combs containing the brood; then place these two hives on top of each other, as explained before, keeping them shaded from the sun until most of the brood is hatched. Then, in the evening, shake the bees from both hives into another single hive and give them frames with comb foundation starters. Let them build comb for four days, as above said, after which, in the evening, take out the new comb and give the bees comb foundation to work out to complete the cure. If the diseased colonies are weak in bees, the bees of two, three or four should be put together, so as to have a strong colony to start the cure with, as it does not pay to spend time over weak colonies.

*When bees are not gathering honey.*—An infected apiary can be cured of foul brood by removing the infected combs in the evenings and giving the bees frames with comb foundation starters on. Then, also in the evenings, feed the bees plenty of sugar syrup; they will draw out the foundation and store the infected honey which they took with them from the old combs. On the fourth evening, replace the new combs made out of the starters by frames with full sheets of comb foundation, and feed plenty of sugar syrup every evening until all the colonies are in first-class order. The sugar syrup should be made of granulated sugar, using one pound of water to every two pounds of sugar, and bringing it to a boil.

*Treatment after all honey gathering is over.*—When the disease is discovered in a few good colonies after the honey season is finished, the best plan is to leave them until an evening in October. Then take every comb out of the diseased colonies, replacing them by six combs of all-sealed or capped stores from sound colonies. Place a division board on either side of these all-capped combs. These colonies will thus be in perfect condition for wintering, and the disease will at the same time be stamped out; for, as there are no empty cells, the bees must have kept the infected honey which they took out of the old combs, until it was consumed, as they could not find a place in the all-capped combs to put it.

If there is a scarcity of all-capped combs from the sound colonies, as many as are required can be secured by putting Miller feeders on sound colonies in the evenings in September and feeding the bees all the sugar syrup they can be made to take; then, in October, each of these fed colonies can spare the two outside combs, which will be perfectly capped all over down to the bottom of the frames. These all-capped combs will provide plenty of good stores to carry out this autumn method of treatment.

All the old infested brood combs which have been removed from the hives, must be burned or made into wax, as well as all the combs made on the starters by the bees during the four days of the treatment.

As to the infected honey, I have always been opposed to having it treated and then fed to bees, for fear that the treatment may not be thorough enough. My recommendation is to bury it in the ground, as well as all the refuse from the honey extracted. This applies also, of course, to the honey stored up in the combs during the four days of the treatment.—W. McEvoy.

*Treatment of the Hives and Frames.*—In Mr. McEvoy's treatment of foul brood, there appears to be a danger that the hives themselves in some of their parts might be tainted with germs of the disease. We would, therefore, strongly recommend to disinfect the hives and the frames that have contained foul brood, by a thorough scalding. This operation is very simple; and, in view of the great losses that have been occasioned by foul brood, it is important to neglect no means to secure success in stamping out the infection.

John Fixter.

# DIVISION OF BOTANY

## FODDER CROPS.

The season of 1903 was not a good one for the production of heavy crops of fodder of any kind. In the East an exceptionally prolonged drought prevented grass and clover from starting well, and although, when rains came, these crops picked up in a surprising manner, still the yields were below the average in most places. A cool, damp autumn prevented corn from maturing and made it difficult to cure all hay crops.

Among various fodder plants which have been grown on the experimental plots at the Central Experimental Farm, one which has lately received much attention is Sainfoin *(Onobrychis sativa,* DC.). This beautiful plant, which may be known at once by its pinnate leaves and large cones of rose pink flowers on slender stems, is allied to the clovers, and, as a rule, is spoken of as a clover in the same way as Alfalfa or Lucerne is. It was noticed on the experimental plots that the flowers of this plant were extremely attractive to bees, and it is also a producer of good fodder, suitable for all stock. It is not as heavy a cropper as Alfalfa, but like that is a persistent perennial which roots deeply and in localities which suit it, produces heavy crops of hay.

The following notes on the cultivation of this plant have been prepared mainly by Mr. John Fixter, the farm foreman at the Central Experimental Farm.

### SAINFOIN.

This clover has attracted much attention on the Central Experimental Farm, both as a fodder plant and also as a honey producer. In its cultivation and manner of growth it resembles alfalfa, but it is slightly finer and grows thicker in the bottom, having a more decided stooling habit, which makes it better for pasture. It is specially liked by sheep. The soil best suited to the growth of this plant seems to be a deep rather dry loam, containing a fair proportion of lime with good natural drainage. It will do well upon almost any soil that is well drained, provided it gets a good start. Heavy clay and light sandy soils both produce excellent crops of sainfoin, but on the latter it naturally requires generous manuring. It should never be sown on land likely to be covered with water at any season of the year. The amount of seed sown under ordinary conditions is about 20 lbs. per acre. Great care should be taken to secure new and plump seed; the hulled seed is preferable when it can be obtained, as it is easier to sow and germinates more quickly. A good seed bed is of great importance, and one of the best methods for preparing this, and also at the same time clearing the land of weeds such as quack grass and thistles, is to cultivate it with a firm-footed cultivator. If the field has been in meadow or grain, do not plough, but simply cultivate and harrow; first cultivate as shallow as possible, then pass the heavy iron harrows at a good sharp walk across the first cultivating. This operation will break up the sod or stubble very fine and leave it on the surface to dry out. The second cultivating should be in the opposite direction to the first, and likewise the harrowing. By this operation two-thirds of the sod will be loosened from its roots. It usually requires about four cultivations and four harrowings to make a perfect job. All this work must be done on fine sunny days, and the sooner after harvest the better. The cultivating and harrowing must be gauged by the growth. If possible, every leaf must be cut off and kept out of sight, and all vegetation brought to the surface to be dried by the sun. This dead but valuable material may, during the autumn, be ploughed under to decay and add to the fertility of the soil. By the next spring this land should be in perfect condition for sowing. The best time to sow is as soon as the ground can be got ready in spring; the seed will then germinate quickly. As sainfoin is a quick-growing and deep-rooting plant, the roots keep going down into the moist earth so that dry weather will not have much effect upon it. If sown with a nurse crop, oats, wheat or barley may be used, but the latter is preferable, as it can be harvested earliest. Not more than half the ordinary amount of grain should be sown per acre with this clover, and better results are usually obtained by sowing it alone. It may be sown broadcast, then harrowed in and rolled so as to render the surface smooth, or it may be sown with the ordinary grain drill with grass seed attachment. The seed should be dropped in front of the drill and the land should afterwards be rolled. The small seeds will thus be covered, and, the surface being smooth, the young plants will come up quickly and regularly. For this crop land may be prepared by late summer-fallowing, or, what is even better, the seeding may follow a hoed crop; but, whatever the preparation of the land, it must be clean, and, as the seeds are small, it is essential to have it in a good state of tilth.

This plant has been grown on the experimental plots at the Central Experimental Farm for several years. The oldest plot now living has been standing for seven years, a second plot for two years, and the third plot was sown in the spring of 1903. The plot which has been growing for seven years is now thin and will soon be ploughed down. It would probably be the most economical plan to plough down this clover after three years and resow. As is well known, clovers of all kinds are the most valuable plants which can be grown and ploughed down as fertilizers, and the benefit of ploughing under this clover would more than pay for the resowing.

The Botanist's records of the experimental plots show that Sainfoin sown May 14, came into bloom on August 12 of the same year, was cut for hay on August 25, and gave a yield per acre of 1 ton 1,700 lbs. of cured hay. The second growth of the first year should be allowed to stand over for the winter as a protection to the roots, In the second year the plants came into bloom on June 1st and lasted up till the 24th of that month, when the plot was cut for hay. These dates might have been extended, had the plants been grown merely for honey; but, as they were at that time in the best condition for hay, they were cut for that purpose. If the crop had been left to stand longer, the hay would have been too woody. The yield of this first cutting was 2 tons 200 lbs. of cured hay per acre—a rather small crop, due to the excessive drought, which lasted up till June 12. The second bloom was on July 27, and lasted until August 17, when it was again cut for hay, giving 2 tons 1,400 lbs. of cured hay, or a total yield for the year of 4 tons 1,600 lbs. A third crop, which will provide some pasture, is allowed to remain on the ground for the winter, or in very favourable seasons might be again cut before winter, although this is not advisable.

From what we have seen of this clover, it is believed that farmers and bee-keepers would find it profitable to grow it.

### HAY AND PASTURE MIXTURES.

In the last annual report the results of growing several mixtures of grasses and clovers were published. These experiments were again observed during the past season, and the yields given herewith are from the same plots which were sown in 1901. Last season should have been the large crop from these plots; but, unfortunately, the yields were very much lessened by the exceptionally dry weather which prevailed in spring at the time when meadows most require copious moisture. The yields for 1903 are given, together with those of the previous year, for comparison. It will be seen that several of these mixtures give heavy yields of excellent hay, and all of them are worthy of the consideration of the farmers of Canada.

| Number. | Mixtures Sown May 4, 1901. | | | | Cured Hay, per Acre. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1903. | | | | Total. | | | |
| | Grasses. | | Clovers. | | July 14. | | Sept. 30. | | 1903. | | 1902. | |
| | | Lbs. | | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Timothy<br>Meadow Fescue<br>Orchard Grass<br>Kentucky Blue<br>Red Top | 6<br>4<br>2<br>1<br>1 | Alfalfa<br>Alsike<br>Mammoth Red<br>Common Red<br>White Dutch | 2<br>2<br>1<br>1<br>2 | 2 | 1,160 | 1 | 1,360 | 4 | 520 | 4 | 40 |
| 2 | Meadow Fescue<br>Timothy<br>Canadian Blue<br>Orchard Grass<br>Red Top | 6<br>3<br>2<br>3<br>3 | Alfalfa<br>Alsike<br>White Dutch | 4<br>1<br>1 | 2 | 720 | 1 | 840 | 3 | 1,560 | 4 | 660 |
| 3 | Timothy<br>Awnless Brome<br>Orchard Grass | 5<br>4<br>2 | Alfalfa<br>Alsike | 6<br>3 | 2 | 1,210 | 1 | 1,560 | 4 | 770 | 5 | 120 |
| 4 | Meadow Fescue<br>Orchard Grass<br>Kentucky Blue | 6<br>2<br>1 | Common Red<br>Alfalfa<br>White Dutch | 4<br>3<br>1 | 2 | 640 | 1 | 1,680 | 4 | 320 | 5 | 1,520 |
| 5 | Timothy<br>Upright Brome | 6<br>4 | Alfalfa<br>Mammoth Red | 6<br>4 | 2 | 1,320 | 1 | 1,520 | 4 | 840 | 4 | 960 |
| 6 | Timothy | 10 | Common Red | 6 | 1 | 1,680 | | 1,200 | 2 | 880 | 4 | 760 |
| 7 | Timothy | 10 | Mammoth Red | 6 | 1 | 520 | | 1,000 | 1 | 1,520 | 3 | 1,200 |
| 8 | Orchard Grass | 18 | Alsike | 5 | 1 | 840 | | 1,240 | 2 | 080 | 2 | 1,200 |
| 9 | Orchard Grass | 18 | Common Red | 8 | 1 | 1,800 | | 1,800 | 2 | 1,600 | 3 | 1,280 |
| 10 | Meadow Fescue | 20 | Common Red | 8 | 1 | 1,320 | | 1,360 | 2 | 680 | 3 | 40 |
| 11 | Timothy | 12 | Mammoth Red | 8 | 2 | 280 | | 1,120 | 2 | 1,400 | 3 | 1,760 |
| 12 | Timothy | 12 | Common Red | 8 | 2 | 80 | | 1,840 | 2 | 1,920 | 3 | 20 |
| 13 | Timothy<br>Awnless Brome | 5<br>10 | Common Red<br>Mammoth Red | 5<br>5 | 1 | 1,920 | | 1,920 | 2 | 1,840 | 4 | 300 |
| 14 | Awnless Brome | 25 | .................... | | 1 | 1,360 | .......... | | 1 | 1,360 | 3 | 1,020 |
| 15 | Awnless Brome | 15 | Common Red | 8 | 2 | 40 | 1 | 320 | 3 | 360 | 4 | 760 |
| 16 | Timothy | 8 | Mammoth Red | 8 | 2 | 480 | 1 | 680 | 3 | 1,160 | 3 | 340 |
| 17 | Alfalfa | 15 | (weight green, 8 tons 720 lbs.) | | 3 | 120 | 1 | 1,040 | 4 | 1,160 | 3 | 1,160 |

There has been a large correspondence carried on with farmers in all parts of Canada with regard to the best grasses to grow for hay and pasture, and also as to the best crops for late sowing in seasons when drought or other adverse conditions have interfered with the germination or development of corn and other fodder crops. In the drier districts of the West excellent results have been secured from sowing Alfalfa and Brome grass together, 12 to 15 lbs. of the former and 6 of the latter, or mixtures in varying proportions according to the requirements of the growers, of the small grains and some leguminous plant. The mixtures, which have given good satisfaction, are: Tares and oats, a bushel and a half of each, or Peas and oats, in the same proportion; Peas, wheat and oats, one bushel of each; or Peas, wheat and late barley. All of these give heavy crops of excellent hay. A valuable crop which is every day growing in favour, is Fodder Rape. This has been grown with much satisfaction in all parts of Canada. It is best sown alone, two pounds of seed to the acre in drills thirty inches apart, so as to allow of cultivation to destroy weeds and to hold in moisture when the seed has been sown late. Crops of rape are ready for cutting or feeding off in about sixty days after sowing. Two or three crops may be taken before winter sets in.

# REPORT OF THE EXPERIMENTALIST.

(CHAS. E. SAUNDERS, B.A., Ph. D.)

Dr. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa

SIR,—I have the honour to submit herewith the first report of the work of this division, which has been in my charge since the commencement of the present year.

The work of cereal breeding occupied a large proportion of my time during the summer season, several weeks being given up almost exclusively to the cross-fertilising of wheat, oats, barley and peas; while the selection of fixed and desirable types from among the progeny of crosses made in previous years demanded considerable attention. The results of the season's work along these lines have been satisfactory.

The uniform tests of new and established varieties of cereals, field roots and fodder corn have been continued in much the same way as usual, and the results are here presented in tables similar to those which annually appeared in your own report during the long period in which this work was under your immediate supervision.

The prolonged drought of spring followed by the extremely wet weather in June proved very unfavourable for most of the early varieties of cereals, and also prevented other crops from giving very large returns; but on the whole the results of the season were fairly good.

The care of those parts of the ornamental grounds which have been assigned to this division occupied a portion of my time. The season was, as a whole, most favourable and flowers: the pansies, roses, pæonies and asters being particularly fine.

During the month of May much time was spent in the hybridising of apples and plums for the production of extremely hardy varieties suitable for the climate of the western prairie country. Thirty-four different crosses were made in apples, yielding 1,021 seeds; one cross was made in plums, yielding 38 seeds; and one cross was made between the plum and the sand cherry, yielding 2 seeds. In the autumn, during your absence in the North-west, a large amount of time was given to studying, comparing and describing the new hybrid apples which were bearing fruit—many of them for the first time.

Considerable time was spent during the winter months in establishing a reference collection of mounted specimens of the heads of cereals. The specimens are attractively and conveniently arranged in a series of shallow cardboard boxes filled with cotton batting and covered with glass. A set of small bottles containing the threshed grain is also being prepared. These collections have already proved very useful for purposes of description, identification, &c.

I acknowledge with pleasure my indebtedness to Mr. George Fixter, whose accurate records of the experimental plots relieved me of a large amount of labour, and to Mr. James Taggart, whose work in the ornamental grounds displayed much care and ability.

The following donations are thankfully acknowledged:—From the United States Department of Agriculture, samples of macaroni wheat, oats and millet ; from Haage and Schmidt, Erfurt, flower seeds; from W. Atlee Burpee, Philadelphia, flower seeds; from J. MacGrady, Gatineau Point, seed of choice delphiniums; and from S. P. Hamilton, Bush Glen, samples of grain from India.

I have the honour to be, sir,
Your obedient servant,
CHAS. E. SAUNDERS,
*Experimentalist.*

## CEREAL BREEDING.

This work falls naturally into two divisions, first, the foundation work of cross-fertilising, and second, the work of selection.

*Cross-fertilising.*—This work in cereals was begun on June 10, and continued until July 14, a considerable proportion of the time being devoted to it. A description of the actual process of cross-fertilising need not be repeated here, as it has been already published in the annual report for the Experimental Farms for 1896 (page 21) and is necessarily of a somewhat technical nature. On account of the great importance and difficulty of this kind of work it is done entirely by the Experimentalist himself, no assistant being employed.

The weather was very favourable and the number of seeds obtained was large. About seventy different crosses between cereals were successfully carried out, producing over 550 kernels. Most of the crosses were made between wheat and wheat, with a view to combining, as far as possible, the extremely desirable qualities of productiveness and earliness with the ability to produce flour of great strength and good colour. The varieties used as parents included some of the most promising of the cross-bred sorts produced at the Experimental Farms, as well as older and standard kinds. Over four hundred kernels of wheat were thus obtained. A much smaller amount of work was done in the crossing of oats, barley and peas. A few mixed crosses, such as between wheat and emmer, were also successfully attempted.

*Selection.*—Each kernel produced by cross-fertilising generally gives rise, in the course of three or four years, to a number of distinct varieties. So that the foundation work of crossing needs to be followed by persistent and rigid selection for several years afterwards, until the various types are fixed, in order to obtain the best possible results from the cross. Selection, as sometimes practised, without previous crossing, is an easy but comparatively unprofitable process, and has little relation to the work here described, inasmuch as those varieties of cereals which have been in cultivation for long periods show little or no tendency to vary until after they have been crossed with some other sort.

Over one hundred new varieties of wheat were grown this season in very small plots. The best types found among these are being selected to sow again next year. These sorts are the progeny of some crosses (made by the writer in 1900) between Red Fife and some of the macaroni wheats and between Colorado and Common Emmer. Most of the types produced from these crosses are not yet fixed. As an instance of extreme variation it may be mentioned that nearly forty varieties have already arisen among the progeny of one of the original (cross-fertilised) seeds.

The tendency of cross-bred cereals to vary for a number of years after their production is also seen in the case of those varieties produced at the Experimental Farm in the earlier years of its history. Some of these, such as Preston wheat, Stanley wheat, &c., have already attracted a good deal of attention. It is found, however, that each of these, as now grown, is not of one fixed type, but contains a small proportion of kernels which appear foreign. Efforts are being made to improve these varieties by reducing each of them to one type as quickly as possible with the intention of supplying only such improved strains as soon as a sufficient quantity of the seed is available. Descriptions of the varieties will be published when the types are decided upon and fixed.

Attention is also being paid to the elimination of the false kernels and undesirable types which are often found in varieties of cereals obtained from commercial and other sources.

Descriptions of five of the cross-bred varieties of wheat produced at the Experimental Farms are here given.

*Preston.*—Parentage, Ladoga (female) crossed with Red Fife (male). Kernels red, above medium size. Heads bearded, usually about 3¾ inches long (at Ottawa). Chaff yellowish (that is, 'white'), smooth. Straw stiff, usually about 44 inches long (at Ottawa). Ripens early (about six days before Red Fife, at Ottawa). Gives a very large yield.

*Stanley.*—Parentage, Ladoga (female) crossed with Red Fife (male). Kernels red, above medium size. Heads beardless, usually about 3¾ inches long. Chaff red, smooth. Straw stiff, usually about 44 inches long. Ripens early (about six days before Red Fife). Gives a good yield.

*Huron.*—Parentage, Ladoga (female) crossed with White Fife (male). Kernels red, above medium size. Heads bearded, usually about 3¾ inches long. Chaff red, smooth. Straw stiff, usually about 45 inches long. Ripens rather early (about 3 days before Red Fife). Gives a large yield.

*Percy.*—Parentage, Ladoga (female) crossed with White Fife (male). Kernels red, above medium size. Heads beardless, usually about 4 inches long. Chaff yellowish, smooth. Straw stiff, usually about 47 inches long. Ripens early (about 5 days before Red Fife). Gives a good yield.

*Laurel.*—Parentage, Red Fife (female), crossed with Gehun (male). Kernels red, above medium size. Heads beardless, usually about 4 inches long. Chaff yellowish, smooth. Straw stiff, usually about 49 inches long. Ripens with Red Fife. Gives a large yield.

## UNIFORM TEST PLOTS OF CEREALS, FIELD ROOTS AND FODDER CORN.

The standard and new varieties of cereals which are obtainable commercially are annually grown in plots of one-fortieth of an acre, along with the cross-bred sorts produced at the Farms and a number of other varieties obtained from various sources. The field roots and fodder corn are grown in similar plots, and the yield per acre is estimated from the crop obtained from two rows, each 33 feet long. The object of these tests is to determine the relative productiveness, earliness, &c., of the different varieties. Those which for a series of years are found to be distinctly inferior are rejected, and strong efforts are made to keep the lists within as small bounds as possible without omitting anything which may ultimately prove of value.

The number of plots grown during the past season was as follows :—Spring wheat, 112; macaroni wheat, 16; winter wheat, 20; emmer and spelt, 12; oats, 81; six-row barley, 33; two-row barley, 25; pease, 44; rye, 1; soja beans, 2; horse beans, 2; millet, 6; turnips, 42; mangels, 32; carrots, 22; sugar beets, 16, and Indian corn 37; making a total of 503 plots. These represent about 430 varieties, duplicate plots having been necessary, for special reasons, in some cases. Nearly all of these varieties will be found reported on in the tables following, only a few of those which are manifestly inferior having been dropped. Quite a number of those mentioned in the last annual report of the Experimental Farms were not sown this season inasmuch as they had shown a distinct lack of productiveness for a series of years.

Some of the cross-bred sorts produced at this Farm have also been withdrawn for more rigid selection, but will probably be introduced again in the course of a few years.

## PREPARATION OF LAND FOR THE UNIFORM TEST PLOTS.

The system of cultivation adopted for the land devoted to the experimental plots is somewhat different from that which is generally considered advisable in ordinary farming. The land used for the plots consists of three separate fields. Each field receives every third year a dressing of fresh barn-yard manure at the rate of about 12 tons per acre. This is placed on the frozen ground in winter in small heaps of about one-third of a cart-load each, and is spread and ploughed under in spring. This field is then used for roots, fodder corn and other hoed crops. In the autumn, after the harvest is over, the land is ploughed about seven inches deep, and is left in that condition until the following spring when it is cultivated twice with a two-horse cultivator and harrowed twice with a smoothing harrow. Cereals are then sown. After the grain is harvested the land is ploughed about three or four inches deep, to start the shed grain and any weed seeds present, and is again ploughed a few weeks later about seven inches deep. In the following spring it is prepared as before and cereals are again sown. It is not, however, the practice to sow the same cereal twice in succession on the same piece of land.

In this way a three-year rotation is kept up which is found to be very satisfactory, the quantity of manure applied maintaining fully and even increasing the fertility of the soil in spite of the great demands made upon it.

## WEATHER.

The weather was quite unusual during the past season : an almost unbroken drought from April 4 to June 11, being followed by a long period of very wet weather. The early varieties of grain suffered most, as they were so far advanced when the rains came that they did not recuperate to the same extent as the later ripening sorts. The earliest varieties of wheat suffered particularly, and the yields are therefore in some cases remarkably low. The wet weather proved very favourable for the spread of rust, which materially diminished the grain crop in some instances. In the case of the field roots the principal effect of the drought was to delay the germination of a large proportion of the seed of both sowings until about the middle of June, when the dormant seed of both sowings germinated together.

In such a season as this it will be readily understood that very slight differences in the composition, drainage, &c., of the soil assumed unusual importance.

## MOST PRODUCTIVE VARIETIES OF CEREALS.

In order to present in as concise a form as possible the most important conclusions to be drawn from the extensive series of tests made at this Farm, very short lists of varieties recommended for cultivation on account of their large yield have been added. No variety is recommended until it has been grown for at least five years, and the conclusions drawn are taken from the average returns for a series of five years or more. The greatest care is exercised to make these comparisons entirely trustworthy, and it is hoped that these short lists will be found useful for reference by farmers who wish to grow only the most productive sorts.

## EARLIEST VARIETIES OF CEREALS.

Brief lists of the earliest varieties of cereals are given in the hope that they may prove useful to farmers in the northern parts of Ontario and Quebec, as well as in other sections of the Dominion where the seasons are comparatively short.

## SPRING WHEAT.

Three additional varieties of spring wheat appear in the list this year.

Marvel, which was obtained from the United States, is a beardless variety with downy chaff, and very closely resembles Blue Stem.

Blue Stem was added to the plots this year chiefly for the sake of comparison with Hayne's Selected Blue Stem, which has been further selected at the Minnesota Experiment Station, and is often referred to as Minnesota No. 169.

Oregon Club is a beardless variety obtained from Oregon. It is not a promising sort for this climate.

All the plots of spring wheat were sown on April 14 or 15, except Marvel, which was sown April 16. The seed was used at the rate of 1½ bushels to the acre. The yields given are calculated from plots of one-fortieth of an acre, except in the case of Huron and Marvel, where one-eightieth of an acre was used.

The yield per acre is expressed in 'bushels' of 60 pounds.

### SPRING WHEAT—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days maturing. | Length of Straw, including Head. | Character of Straw. | Length of Head. | Yield per Acre. | | Weight per measured bushel after cleaning. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Inches. | | Inches. | Bush. | Lbs. | Lbs. | |
| 1 | Advance* | Aug. 7 | 115 | 47 to 49 | Stiff. | 2¾ to 3¼ | 34 | 40 | 59½ | Slightly. |
| 2 | Nixon* | ″ 10 | 117 | 46 ″ 48 | ″ | 3½ ″ 4 | 33 | 20 | 60 | ″ |
| 3 | Australian I | ″ 12 | 119 | 40 ″ 42 | Medium | 3 ″ 3½ | 32 | 40 | 58 | Considerably. |
| 4 | Benton* | ″ 5 | 113 | 43 ″ 45 | ″ | 3 ″ 3½ | 30 | 20 | 58½ | ″ |
| 5 | McKendry's Fife (Minn. 181) | ″ 16 | 124 | 43 ″ 45 | Stiff. | 3½ ″ 4¼ | 30 | 20 | 59 | Slightly. |
| 6 | Preston* | ″ 5 | 113 | 35 ″ 37 | Medium | 3¼ ″ 3¾ | 29 | 40 | 59 | ″ |
| 7 | Minnesota No. 163 | ″ 16 | 124 | 42 ″ 44 | Stiff. | 3 ″ 3¾ | 29 | 20 | 59 | ″ |
| 8 | Wellman's Fife | ″ 14 | 122 | 44 ″ 46 | ″ | 3¼ ″ 4 | 29 | .. | 60 | ″ |
| 9 | Marvel | ″ 16 | 122 | 42 ″ 44 | ″ | 3¾ ″ 4½ | 28 | 40 | 59½ | ″ |
| 10 | Robin's Rust Proof | ″ 10 | 118 | 40 ″ 42 | ″ | 2¾ ″ 3¼ | 28 | 20 | 60 | ″ |
| 11 | Australian F | ″ 12 | 119 | 38 ″ 40 | ″ | 3 ″ 3¾ | 28 | 20 | 60¼ | Considerably. |
| 12 | Monarch | ″ 15 | 123 | 40 ″ 42 | ″ | 3¾ ″ 4½ | 28 | .. | 58 | Slightly. |
| 13 | Florence* | ″ 4 | 111 | 43 ″ 45 | ″ | 2½ ″ 3¼ | 27 | 40 | 58½ | Badly. |
| 14 | White Connell | ″ 14 | 122 | 43 ″ 45 | ″ | 3 ″ 3¾ | 27 | 20 | 59 | Slightly. |
| 15 | Hungarian | ″ 5 | 113 | 41 ″ 43 | Medium | 3 ″ 3¾ | 27 | 20 | 59½ | Considerably. |
| 16 | Orleans* | ″ 6 | 113 | 42 ″ 44 | ″ | 3 ″ 3¾ | 27 | 20 | 58½ | ″ |
| 17 | Redpath* | ″ 15 | 122 | 43 ″ 45 | Stiff. | 3¼ ″ 3¾ | 27 | 20 | 58½ | Slightly. |
| 18 | White Fife | ″ 15 | 123 | 42 ″ 44 | ″ | 3¼ ″ 4 | 27 | . | 59½ | ″ |
| 19 | White Russian | ″ 13 | 121 | 37 ″ 39 | Medium | 3¼ ″ 3¾ | 26 | 40 | 58 | ″ |
| 20 | Byron* | July 31 | 108 | 39 ″ 41 | ″ | 2¾ ″ 3¼ | 26 | 20 | 59 | Badly. |
| 21 | Huron* | Aug. 10 | 118 | 40 ″ 42 | ″ | 3 ″ 3¾ | 26 | .. | 60½ | Considerably. |
| 22 | Pringle's Champlain | ″ 9 | 117 | 44 ″ 46 | ″ | 3¾ ″ 4½ | 26 | .. | 58 | Slightly. |
| 23 | Australian C | ″ 12 | 119 | 42 ″ 44 | Stiff. | 3¼ ″ 3¾ | 26 | .. | 58¾ | ″ |
| 24 | Australian D | ″ 5 | 112 | 42 ″ 44 | ″ | 3 ″ 3¾ | 26 | .. | 60¼ | Considerably. |
| 25 | Red Fife | ″ 15 | 123 | 41 ″ 43 | ″ | 3¼ ″ 4 | 25 | 40 | 59½ | Slightly. |
| 26 | Herisson Bearded | ″ 6 | 114 | 35 ″ 37 | Medium | 1½ ″ 2 | 25 | 40 | 57 | Considerably. |
| 27 | Dawson* | ″ 14 | 121 | 44 ″ 46 | Stiff. | 3½ ″ 4¼ | 25 | 40 | 59 | Slightly. |
| 28 | Norval* | ″ 10 | 118 | 37 ″ 39 | Medium | 2½ ″ 3¼ | 25 | 40 | 58½ | Considerably. |
| 29 | Essex* | ″ 13 | 121 | 45 ″ 47 | Stiff. | 3 ″ 3¾ | 25 | 20 | 59 | ″ |
| 30 | Harper* | ″ 8 | 115 | 38 ″ 40 | Medium. | 2¾ ″ 3¼ | 25 | 20 | 56 | Badly. |
| 31 | Clyde* | ″ 10 | 118 | 40 ″ 42 | Stiff. | 3 ″ 3½ | 25 | .. | 58½ | Slightly. |
| 32 | Blue Stem | ″ 15 | 122 | 46 ″ 48 | ″ | 3¾ ″ 4¼ | 25 | .. | 60 | ″ |
| 33 | Australian No. 1 | ″ 12 | 119 | 38 ″ 40 | Medium | 3 ″ 3½ | 24 | 40 | 58½ | Considerably. |
| 34 | Gehun | July 27 | 103 | 39 ″ 41 | Weak | 2 ″ 2½ | 24 | 20 | 57½ | ″ |
| 35 | Oxbow* | Aug. 8 | 115 | 40 ″ 42 | ″ | 2½ ″ 3 | 24 | 20 | 59 | Badly. |
| 36 | Haynes' Blue Stem (Minn. 169) | ″ 17 | 125 | 46 ″ 48 | Stiff. | 3½ ″ 4¼ | 24 | 20 | 59½ | Slightly. |
| 37 | Australian No. 19 | ″ 15 | 123 | 41 ″ 43 | ″ | 2¾ ″ 3¼ | 24 | 20 | 58½ | ″ |
| 38 | Australian No. 23 | ″ 14 | 122 | 41 ″ 43 | ″ | 3¼ ″ 4 | 24 | 20 | 58 | ″ |
| 39 | Weldon* | ″ 10 | 118 | 42 ″ 44 | ″ | 3 ″ 3¾ | 24 | .. | 58½ | ″ |
| 40 | Harold* | July 27 | 103 | 39 ″ 41 | Weak | 2¾ ″ 3¼ | 23 | 20 | 58 | Badly. |
| 41 | Crown* | Aug. 10 | 118 | 42 ″ 44 | Medium | 2½ ″ 3 | 23 | 20 | 58½ | Slightly. |
| 42 | Australian No. 27 | ″ 13 | 121 | 46 ″ 48 | Stiff. | 3 ″ 3¾ | 23 | 20 | 58¼ | Considerably. |
| 43 | Australian No. 21 | ″ 8 | 115 | 39 ″ 41 | Medium | 3 ″ 3¾ | 23 | .. | 57½ | Badly. |

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

| Number. | Name of Variety. | Date of Ripening. | No. of Days maturing. | Length of Straw, including Head. | Character of Straw. | Length of Head. | Yield per Acre. | | Weight per measured bushel after cleaning. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Inches. | | Inches. | Bush. | Lbs. | Lbs. | |
| 44 | Australian H .......... .... | Aug 16 | 123 | 44 to 46 | Stiff...... | 3½ to 4¼ | 23 | .. | 58½ | Slightly. |
| 45 | Stanley*..................... | " 1 | 109 | 39 " 41 | " ..... | 3¼ " 4 | 22 | 40 | 60½ | Considerably. |
| 46 | Blair* .................... | " 7 | 115 | 38 " 40 | Weak .... | 3½ " 4 | 22 | 40 | 59½ | " |
| 47 | Grant*....................... | " 5 | 112 | 39 " 41 | Stiff...... | 3¼ " 3¾ | 22 | 40 | 58 | Slightly. |
| 48 | Countess* ......... ... ... | July 31 | 108 | 39 " 41 | Medium.. | 2¾ " 3¼ | 22 | 20 | 59 | Considerably. |
| 49 | Australian No. 25...... .... | Aug. 13 | 121 | 40 " 42 | Stiff...... | 3½ " 4 | 22 | 20 | 58 | Slightly. |
| 50 | Australian No. 28........... | " 8 | 115 | 40 " 42 | " ..... | 3 " 3½ | 22 | 20 | 61 | " |
| 51 | Australian E................ | " 12 | 119 | 45 " 47 | " ..... | 3¼ " 4 | 22 | 20 | 58 | Considerably. |
| 52 | Australian J.... .......... | " 4 | 111 | 41 " 43 | " ..... | 3 " 3½ | 22 | 20 | 60 | " |
| 53 | Colorado :.................. | " 6 | 114 | 40 " 42 | " ..... | 2¾ " 3¼ | 22 | .. | 59½ | Slightly. |
| 54 | Ebert*........................ | July 28 | 104 | 44 " 46 | Medium.. | 3 " 3½ | 22 | .. | 60 | Considerably. |
| 55 | Power's Fife (Minn. 149)..... | Aug. 16 | 124 | 39 " 41 | Stiff...... | 3 " 3¾ | 22 | .. | 59½ | Slightly. |
| 56 | Australian No. 11.... ....... | " 16 | 123 | 46 " 48 | " ..... | 3½ " 4¼ | 22 | .. | 58 | " |
| 57 | Red Fern.................... | " 10 | 118 | 44 " 46 | " ..... | 3½ " 4¼ | 21 | 40 | 60 | " |
| 58 | Crawford* .................. | July 31 | 108 | 37 " 39 | " . ... | 2¾ " 3¼ | 21 | 40 | 59½ | " |
| 59 | Bishop*.... .............. | " 31 | 108 | 42 " 44 | Medium.. | 2¾ " 3¼ | 21 | 40 | 60 | Badly. |
| 60 | Angus*....................... | Aug. 7 | 115 | 48 " 50 | Stiff...... | 3¼ " 3¾ | 21 | 40 | 58½ | " |
| 61 | Powell*....................... | " 5 | 112 | 39 " 41 | " ..... | 2½ " 3¼ | 21 | 40 | 58 | Considerably. |
| 62 | Cartier* .... ................ | July 31 | 108 | 40 " 42 | " ..... | 2½ " 3¼ | 21 | 20 | 60½ | " |
| 63 | Laurel*....................... | Aug. 13 | 121 | 42 " 44 | " ..... | 3½ " 4¼ | 21 | .. | 59½ | Slightly. |
| 64 | Boyle*........................ | " 12 | 119 | 42 " 44 | " ..... | 3 " 3¾ | 21 | .. | 58 | Considerably. |
| 65 | Australian No. 13. . . ..... | " 15 | 123 | 39 " 41 | " .. .. | 2¾ " 3½ | 21 | .. | 59 | Slightly. |
| 66 | Rio Grande.................. | " 16 | 124 | 46 " 48 | " ..... | 3¼ " 4 | 20 | 40 | 58 | " |
| 67 | Alpha*........................ | " 10 | 118 | 37 " 39 | Medium.. | 3 " 3½ | 20 | 20 | 59 | Considerably. |
| 68 | Morley* ..... .... ........ | " 10 | 117 | 43 " 45 | Stiff...... | 3¾ " 4½ | 20 | 20 | 57¾ | Slightly. |
| 69 | Dawn*........................ | " 4 | 112 | 38 " 40 | " ... . | 2¾ " 3½ | 20 | 20 | 59½ | Considerably. |
| 70 | Australian No. 12. ......... | " 7 | 114 | 38 " 40 | Weak .... | 2½ " 3 | 20 | 20 | 58¼ | " |
| 71 | Plumper*. ................ | " 6 | 114 | 36 " 38 | Medium .. | 2¼ " 2¾ | 20 | .. | 59½ | " |
| 72 | Percy* ....................... | " 7 | 115 | 38 " 40 | Stiff...... | 3¼ " 3¾ | 19 | 40 | 59 | Slightly. |
| 73 | Hastings*.... ............. | " 5 | 113 | 38 " 40 | Medium.. | 3 " 3¾ | 19 | 40 | 58¼ | Considerably. |
| 74 | Fraser*....................... | July 28 | 105 | 39 " 41 | " .. | 2½ " 3¼ | 19 | 40 | 59¼ | Badly. |
| 75 | Chester*.................... | Aug. 8 | 116 | 39 " 41 | " .. | 3 " 3¾ | 19 | 20 | 58¾ | " |
| 76 | Admiral*..................... | " 8 | 116 | 44 " 46 | Stiff...... | 3 " 3½ | 19 | .. | 58 | Considerably. |
| 77 | Japanese.................... | July 29 | 106 | 37 " 39 | " ..... | 2¼ " 2¾ | 19 | .. | 59 | " |
| 78 | Progress*.................... | Aug. 6 | 114 | 40 " 42 | " ..... | 2¾ " 3½ | 18 | 40 | 59¼ | " |
| 79 | Vernon*.............. .. . | " 10 | 118 | 38 " 40 | " ..... | 2¾ " 3¼ | 18 | 40 | 58½ | Slightly. |
| 80 | Australian No. 18. ......... | " 15 | 122 | 46 " 48 | " ..... | 3¼ " 4 | 18 | 40 | 60 | " |
| 81 | Red Swedish.. ...... .... .. | " 13 | 121 | 37 " 39 | Weak . .. | 2½ " 3¼ | 18 | 20 | 59 | " |
| 82 | Newdale*...... . ......... | " 7 | 114 | 38 " 40 | Stiff...... | 3¼ " 4 | 18 | 20 | 59 | " |
| 83 | Steinwedel................... | " 1 | 108 | 39 " 41 | " ..... | 2¾ " 3¼ | 18 | 20 | 57½ | Considerably. |
| 84 | Australian No. 10. .......... | " 14 | 122 | 34 " 36 | " ..... | 2¼ " 3 | 18 | .. | 58½ | Slightly. |
| 85 | Markham*.................... | " 10 | 117 | 40 " 42 | " ..... | 3 " 3½ | 17 | 40 | 58 | " |
| 86 | Australian No. 15. .......... | " 16 | 123 | 40 " 42 | " ..... | 2¾ " 3½ | 17 | 40 | 61 | " |
| 87 | Spence*.. ............... .... | July 28 | 104 | 40 " 42 | Medium .. | 2½ " 3 | 17 | .. | 59 | Considerably. |
| 88 | Tracey* ..................... | Aug. 13 | 120 | 46 " 48 | Stiff...... | 3 " 3¾ | 16 | 40 | 59 | Slightly. |
| 89 | Australian No. 9 ...... .... | " 1 | 109 | 34 " 36 | Medium.. | 2¾ " 3¼ | 14 | 40 | 58½ | Considerably. |
| 90 | Cassel*....................... | " 10 | 118 | 38 " 40 | Stiff...... | 3 " 3¾ | 14 | 20 | 57½ | Slightly. |
| 91 | Oregon Club .................. | " 3 | 110 | 35 " 37 | " ..... | 1¾ " 2¼ | 13 | 20 | 57 | Badly. |
| 92 | Dayton*...................... | " 4 | 111 | 42 " 44 | " ..... | 3 " 3¾ | 13 | .. | 59 | Considerably. |
| 93 | Early Riga* ................. | July 28 | 105 | 38 " 40 | " ..... | 2¾ " 3¼ | 10 | .. | 56½ | Badly. |

* Cross-bred varieties produced at the Experimental Farms.

## MOST PRODUCTIVE VARIETIES OF SPRING WHEAT.

Taking the average of the returns for a series of years, the varieties of spring wheat found to be the most productive at this Farm are Preston, Huron, Pringle's Champlain, Wellman's Fife and Hungarian. Preston stands at the head of the list for productiveness (macaroni wheats being excluded). Red Fife gives a distinctly smaller yield than Preston, but is slightly superior in value from a miller's point of view.

### EARLIEST VARIETIES OF SPRING WHEAT.

The earliest varieties now grown at this Farm (as shown by the average of the records for several years) are Harold, Gehun, Early Riga, Fraser and Ebert. These ripen, as a rule nearly two weeks earlier than Red Fife, and about one week earlier than Preston. These earlier varieties are not yet available for general distribution, but their value for the production of flour is being investigated with a view to the propagation of the best variety, or varieties, for those parts of the country where earliness is of the greatest importance.

### STUDY OF THE QUALITY OF VARIOUS KINDS OF WHEAT.

The value from a miller's point of view of the various sorts of wheat is so important a consideration that steps are being taken towards the testing of all the varieties grown on this Farm. A rough preliminary test of most of the important sorts of spring wheat has been made and valuable information has been gained, although the results must be regarded as suggestive rather than conclusive.

In the case of some of the most important varieties, where larger quantities of grain were available, actual milling tests have been obtained. The results of some of these tests will be found in the report of the Director for this year.

It is proposed to subject all the new varieties which may be produced at this Farm to a critical examination by the methods indicated, before sending them out for test elsewhere.

## MACARONI WHEAT.

It has been thought best to publish the results of the comparative tests of varieties of macaroni wheat in a separate table, rather than in conjunction with the ordinary sorts of spring wheat. While it is possible to make good flour from some kinds of macaroni wheat, such flour is peculiar in its character and is generally unpopular. Furthermore, the extreme hardness of the kernels necessitates special care in the milling of these kinds of wheat. They are naturally, therefore, looked upon with disfavour by millers.

Farmers who grow any of these varieties should exercise the utmost care to prevent them from becoming mixed with the standard sorts used for flour making. Conversely, macaroni wheat in which kernels of other types of wheat are found is regarded as much less valuable for its special purpose.

Macaroni wheat appears to succeed best in rather dry climates, and can often be successfully grown on rather poor and sandy soil, where it is difficult to obtain a good yield of the better varieties of wheat.

Through the courtesy of the Department of Agriculture at Washington, U.S., the following new varieties of macaroni wheat were obtained this year and were tested in the uniform plots :—

Medeah (No. 7579) from Algeria.
Kahla (No. 7794) from Algeria.
Mahmoudi (No. 7792) from Algeria.
Mishriki (No. 7016) from Egypt.
Gejar (No. 7430) from Spain.
Girgeh (No. 7422) from Egypt.

Most of these gave fair yields, except Gejar and Girgeh, both of which proved entirely unsuitable for this climate.

The plots of macaroni wheat were all one-fortieth of an acre in extent. The seed was sown on April 14 and 15, at the rate of 1½ bushels to the acre.

The yield per acre is expressed in 'bushels' of 60 pounds.

MACARONI WHEAT—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw, including Head. | Character of Straw. | Length of Head. | Yield per Acre. | | Weight per Measured Bushel after Cleaning. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | Bush. | lbs. | Lbs. | |
| 1 | Yellow Gharnovka (Washington, No. 5642)....... | Aug. 17.. | 124 | 44-46 | Medium.. | 3¼-3¾ | 33 | 40 | 59¾ | Slightly. |
| 2 | Gharnovka (Washington, No. 5646) ............ | " 18.. | 125 | 40-42 | " .. | 2½-3¼ | 31 | 20 | 59 | " |
| 3 | Beloturka (Washington, No. 5800).. ........... | " 18.. | 125 | 45-47 | " .. | 2¼-3 | 31 | 20 | 58 | " |
| 4 | Kubanka (Washington, No. 5639)........... .. | " 18.. | 125 | 41-43 | " .. | 2¼-2¾ | 29 | .. | 61¼ | " |
| 5 | Black Don (Washington, No. 5645)........ ..... | " 7.. | 114 | 40-42 | " .. | 2 -2¾ | 27 | 40 | 61 | " |
| 6 | Roumanian.............. | " 7.. | 115 | 40-42 | Weak ... | 2 -2½ | 27 | .. | 61 | Considerably. |
| 7 | Medeah.................. | " 6.. | 113 | 41-43 | Medium.. | 2 -2½ | 27 | .. | 60½ | " |
| 8 | Velvet Don (Washington, No. 5644).. ........... | " 11.. | 118 | 38-40 | Stiff..... | 2 -2¾ | 27 | .. | 60 | Slightly. |
| 9 | Kahla.................... | " 12.. | 119 | 36-38 | Weak .... | 1¾-2¼ | 25 | .. | 58 | Considerably. |
| 10 | Mahmoudi ........ ..... | " 6.. | 113 | 36-38 | " .... | 1¾-2¼ | 23 | 20 | 57¾ | Slightly. |
| 11 | Goose.................... | " 7.. | 115 | 40-42 | Medium.. | 2¼-2¾ | 19 | .. | 58½ | Badly. |
| 12 | Mishriki ................ | " 5.. | 112 | 34-36 | " .. | 1¾-2¼ | 14 | 20 | 47½ | " |

## WINTER WHEAT.

The plots of winter wheat were sown on September 6, 1902. The size of the plots was one-fortieth of an acre each; and the seed was used at the rate of 1¾ bushels to the acre.

The plots looked well when winter set in; but were found to be considerably injured when growth commenced in spring. The yield of all the varieties except Imperial Amber, Reliable, Egyptian Amber and American Bronze has been estimated from one-eightieth of an acre only, taking the better half of the plot in each case. The yield of the varieties above-mentioned has been calculated from the whole plot. Surprise, Red Velvet Chaff, Poole and Tasmania Red were so largely winter-killed that no accurate estimate of their yield could be made.

The yield per acre is expressed in 'bushels' of 60 pounds.

(Photo. by C. E. Saunders.)

Double rows of Cereals at Experimental Farm, Ottawa.

WINTER WHEAT—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw, including Head. | Character of Straw. | Length of Head. | Yield per Acre. | | Weight per Measured Bushel after Cleaning. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | Bush. | lbs. | Lbs. | |
| 1 | Turkey Red | July 23 | 320 | 37-39 | Weak | 3 -3½ | 45 | 20 | 62 | Slightly. |
| 2 | Dawson's Golden Chaff | " 21 | 318 | 38-40 | Stiff | 2¾-3¼ | 41 | 20 | 63 | " |
| 3 | Imperial Amber | " 19 | 316 | 44-46 | Medium | 3 -3½ | 39 | 20 | 62¾ | " |
| 4 | Reliable | " 23 | 320 | 48-50 | " | 3½-4¼ | 36 | .. | 62½ | " |
| 5 | Egyptian Amber | " 23 | 320 | 38-40 | Stiff | 3 -3¾ | 35 | 20 | 62½ | " |
| 6 | Early Red Clawson | " 19 | 316 | 38-40 | " | 2¾-3¼ | 34 | 40 | 61½ | " |
| 7 | Buda Pesth | " 25 | 322 | 40-42 | Medium | 3 -3½ | 33 | 20 | 62½ | " |
| 8 | Long Berry Red | " 19 | 316 | 38-40 | Stiff | 3 -3½ | 33 | 20 | 62 | " |
| 9 | Bonnell | " 23 | 320 | 47-49 | Medium | 3¼-3¾ | 33 | 20 | 62¼ | " |
| 10 | Treadwell | " 22 | 319 | 41-43 | " | 3 -3½ | 32 | 40 | 62 | " |
| 11 | Jones' Winter Fife | " 22 | 319 | 40-42 | Stiff | 3 -3½ | 32 | .. | 62½ | " |
| 12 | Golden Cross | " 20 | 317 | 37-39 | " | 2 -2½ | 32 | .. | 61 | Considerably. |
| 13 | Gold Coin | " 22 | 319 | 38-40 | " | 2¾-3¼ | 30 | 40 | 62 | Slightly. |
| 14 | Pride of Illinois | " 20 | 317 | 40-42 | " | 3½-4 | 30 | 40 | 62 | " |
| 15 | American Bronze | " 22 | 319 | 43-45 | " | 3¼-3¾ | 30 | .. | 62½ | " |
| 16 | Velvet Chaff | " 18 | 315 | 38-40 | " | 2¾-3¼ | 29 | 20 | 62 | Considerably. |

## EMMER AND SPELT.

The different varieties of emmer and spelt are separated in this report from the varieties of wheat on account of their peculiar characteristics. The emmers and spelts are distinguished by the fact that in ordinary threshing the kernels are not separated from the chaff: the chaff generally constituting about 21 to 26 per cent of the total weight of the product in the case of the emmers, and about 27 to 35 per cent in the case of the spelts. The latter are, as a rule, much the coarser. In estimating the yield of these grains, it is obvious that no comparison can be made with wheat until a proper deduction has been made for the chaff present. The neglect of this precaution is one of the reasons why Common Emmer (often incorrectly called Speltz) has attracted an undue amount of attention of late. This grain, after threshing and grinding, makes valuable food for animals, but it seldom gives a yield equal to that of the best varieties of other cereals. Some farmers who have cut their emmer green for fodder report that it is unsatisfactory in that condition, partly, no doubt, on account of the awns which are present.

The only new emmer introduced this year is Triticum monococcum, a variety with very small and pretty heads, presenting a most attractive appearance in the field. It gave the heaviest yield in the plots this season, but will probably not maintain that position in the future as its extreme lateness gave it a distinct advantage this year owing to the peculiar character of the weather.

The plots of emmer and spelt were one-fortieth of an acre, except in the case of Triticum monococcum, which was grown on one-eightieth of an acre only. The grain was sown on April 17, at the rate of about 120 pounds per acre.

As some confusion exists at present in regard to the number of pounds which should be considered as a bushel of emmer or spelt, the yield is given in the following table in pounds per acre :—

EMMER AND SPELT—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw, including Head. | Character of Straw. | Length of Head. | Yield per Acre. | Weight per Measured Bushel after Cleaning. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | Lbs. | Lbs. | |
| 1 | Triticum monococcum.... | Sept. 11.. | 147 | 40-42 | Stiff ... . | 2¼-3 | 2720 | 25 | Slightly. |
| 2 | Red Spelt (No. 1990) ..... | Aug. 19.. | 124 | 45-47 | " ..... | 3¼-4 | 2660 | 27½ | " |
| 3 | Smooth Spelt (No. 1993).. | " 18.. | 123 | 43-45 | " ..... | 4¼-5 | 2380 | 29 | " |
| 4 | White Spelt (No. 1991)... | " 17.. | 122 | 48-50 | " ..... | 4¼-5 | 1940 | 29 | " |
| 5 | Long Emmer (No. 1994).. | " 29.. | 134 | 42-44 | " ..... | 3 -3¾ | 1760 | 28½ | " |
| 6 | Red Emmer (No. 1989) ... | " 19.. | 124 | 40-42 | " ..... | 2¼-3 | 1740 | 32 | " |
| 7 | White Bearded Spelt (No. 1995) ................ | " 16.. | 121 | 34-36 | " ..... | 3 -3¾ | 1600 | 29 | " |
| 8 | Black Bearded Spelt (No. 1985) ................ | " 16.. | 121 | 38-40 | Medium.. | 3¾-4¼ | 1580 | 27 | " |
| 9 | White Emmer (No. 1981).. | " 28.. | 133 | 41-43 | Stiff ..... | 2¼-3 | 1540 | 30 | " |
| 10 | Ufa Emmer (Washington, No. 2959).............. | " 9.. | 114 | 34-36 | Medium.. | 1¾-2¼ | 1320 | 33½ | " |
| 11 | Common Emmer ("Speltz") | " 12.. | 117 | 31-33 | Stiff ..... | 1¾-2¼ | 1300 | 35 | " |
| 12 | Thick Emmer (No. 1984).. | " 17.. | 122 | 34-36 | " .... | 2 -2¾ | 1020 | 29 | " |

## OATS.

Five new names were added to the list of varieties of oats in the uniform test this season.

Excelsior is a new black oat produced by Garton Bros. (England). The original sample was remarkably plump and weighed 44 pounds to the measured bushel.

Storm King is another new oat produced by Garton Bros. The seed received was very large but not remarkably plump, weighing 40½ pounds per measured bushel. This variety presents a very striking appearance in the field, producing straw of very large diameter. It, however, lodged slightly in some parts of the plot. The yield obtained was rather small, but the figures are not published, as the quantity of seed on hand was not sufficient to sow the plot as thickly as was desirable. Oats of such remarkable size require a larger quantity of seed per acre than those of smaller dimensions.

Golden Fleece and Sheffield Standard were advertised as two distinct varieties, but the difference, if any, between them is very slight. The original samples of seed received weighed only 33¾ pounds per bushel in each case.

The Chinese Naked oat has the peculiarity of threshing out free from husk. The yield given in the table represents, therefore, free kernels. In order to make this comparable with the yields of the other varieties of oats, the quantity obtained must be considered as about 72 per cent of that which would have been obtained had the hulls remained on the oats, most varieties of oats having only about 72 per cent of kernel as ordinarily threshed. Estimated in this way the yield of Chinese Naked oat becomes 44 bushels 4 pounds per acre.

All the plots of oats were sown April 20, except Chinese Naked, which was sown April 17. The plots were one-fortieth of an acre, and the seed was sown at the rate of two bushels per acre.

The yield per acre is expressed in 'bushels' of 34 pounds.

## OATS—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw, includi'g Head. | Character of Straw. | Length of Head. | Yield per Acre. | | Weight per Measured Bushel after Cleani'g | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Inches. | | Inches. | Bush. | Lbs. | Lbs. | |
| 1 | Golden Giant.... .... | Aug. 14. | 116 | 46—48 | Stiff ... | 7½—9 | 86 | 16 | 34½ | Considerably. |
| 2 | Probstey .... | " 16. | 118 | 46—48 | Weak .. | 8—9½ | 80 | .. | 36 | Badly. |
| 3 | Holland*.... | " 17. | 119 | 45—47 | " .. | 8½—10 | 77 | 22 | 35 | " |
| 4 | Dixon*.... | " 15. | 117 | 48—50 | Stiff ... | 8—9½ | 77 | 22 | 35½ | " |
| 5 | Scotch Potato.... | " 14. | 116 | 49—51 | Medium | 9—10½ | 77 | 2 | 37 | Slightly. |
| 6 | Bestehorn's Abundance ... | " 16. | 118 | 44—46 | Weak .. | 7½—9¼ | 75 | 30 | 35 | Badly. |
| 7 | Virginia White Abundance | " 17 | 119 | 40—42 | " .. | 6½—8 | 75 | 10 | 37½ | " |
| 8 | Great Northern.... | " 14. | 116 | 44—46 | Medium | 7—8½ | 74 | 24 | 35½ | Considerably. |
| 9 | White Giant.... | " 14. | 116 | 44—46 | Stiff ... | 8—9½ | 74 | 4 | 35½ | Slightly. |
| 10 | Golden Beauty.... | " 12. | 114 | 45—47 | " ... | 8—9½ | 73 | 18 | 35 | Considerably. |
| 11 | Golden Tartarian.... | " 18. | 120 | 46—48 | Medium | 8—9½ | 71 | 26 | 34½ | Badly. |
| 12 | Banner.... | " 13. | 115 | 40—42 | Stiff ... | 7—8½ | 71 | 6 | 36½ | Considerably. |
| 13 | Abundance.... | " 13. | 115 | 44—46 | Medium | 8½—9½ | 71 | 6 | 36½ | Slightly. |
| 14 | Twentieth Century.... | " 17. | 119 | 45—47 | " .. | 8½—10 | 71 | 6 | 38 | Considerably. |
| 15 | Siberian.... | " 16. | 118 | 44—46 | Stiff ... | 8½—9¾ | 70 | 20 | 34½ | Badly. |
| 16 | Columbus.... | " 13. | 115 | 40—42 | Weak .. | 7—8½ | 70 | 20 | 34½ | " |
| 17 | Swedish Select.... | " 17. | 119 | 38—40 | Medium | 6—7½ | 70 | 20 | 36½ | " |
| 18 | Mennonite.... | " 15. | 117 | 42—44 | " .. | 8½—9½ | 70 | .. | 34 | " |
| 19 | Hazlett's Seizure.... | " 14. | 116 | 43—45 | Stiff ... | 7½—9 | 68 | 28 | 35 | Slightly. |
| 20 | Improved Ligowo.... | " 13. | 115 | 44—46 | Medium | 8—8½ | 67 | 22 | 37 | Considerably. |
| 21 | Sensation.... | " 15. | 117 | 44—46 | " .. | 7½—9 | 67 | 22 | 37½ | " |
| 22 | Excelsior (black).... | " 17. | 119 | 42—44 | Stiff ... | 7½—8½ | 67 | 22 | 36½ | " |
| 23 | Black Beauty.... | " 13. | 115 | 40—42 | Weak .. | 8½—10½ | 67 | 2 | 35 | " |
| 24 | Kendal White*.... | " 14. | 116 | 45—47 | Medium | 8½—10 | 67 | 2 | 34½ | " |
| 25 | Wide Awake.... | " 16. | 118 | 42—44 | Stiff ... | 6¾—8 | 66 | 16 | 36 | Slightly. |
| 26 | Uberfluss.... | " 16. | 118 | 44—46 | Medium | 6½—7¾ | 66 | 16 | 34 | Badly. |
| 27 | American Triumph.... | " 18. | 120 | 40—42 | Stiff ... | 7½—8¾ | 65 | 30 | 35 | Considerably |
| 28 | Sorgenfrei.... | " 16. | 118 | 43—45 | Weak .. | 7¼—8¾ | 65 | 10 | 36 | " |
| 29 | Australian.... | " 17. | 119 | 46—48 | Medium | 8—9½ | 65 | 10 | 35 | Badly. |
| 30 | Golden Fleeee.... | " 15. | 117 | 46—48 | Stiff ... | 7—8½ | 64 | 24 | 34 | Considerably |
| 31 | Pense White*.... | " 12. | 114 | 47—49 | Medium | 9—10½ | 64 | 4 | 37 | Badly. |
| 32 | Atlantic.... | " 17. | 119 | 44—46 | Weak .. | 7½—8¾ | 62 | 32 | 35½ | " |
| 33 | Salines.... | " 17. | 119 | 47—49 | Stiff ... | 7¼—9 | 62 | 32 | 35 | Considerably. |
| 34 | Lincoln.... | " 13. | 115 | 47—49 | " ... | 8½—9 | 62 | 12 | 37½ | Slightly. |
| 35 | Tartar King.... | " 10. | 112 | 46—48 | " ... | 8½—9½ | 61 | 26 | 36½ | Badly. |
| 36 | Improved American.... | " 13. | 115 | 39—41 | " ... | 7—8½ | 61 | 26 | 36 | Slightly. |
| 37 | Waverley.... | " 14. | 116 | 48—50 | " ... | 7½—9 | 61 | 6 | 35½ | " |
| 38 | Olive Black*.... | " 15. | 117 | 44—46 | Weak .. | 8½—10 | 61 | 6 | 35½ | Badly. |
| 39 | Forbes*.... | " 18. | 120 | 44—46 | Medium | 8¾—9½ | 61 | 6 | 34 | Considerably. |
| 40 | Irish Victor.... | " 15. | 117 | 39—41 | Stiff ... | 7½—9½ | 60 | 20 | 36 | Slightly. |
| 41 | Danish Island.... | " 13. | 115 | 43—45 | " ... | 7—8½ | 60 | 20 | 35½ | " |
| 42 | Olive White*.... | " 14. | 116 | 47—49 | Weak .. | 8½—9½ | 60 | 20 | 35 | Badly. |
| 43 | Goldfinder.... | " 16. | 118 | 45—47 | Medium | 7¼—8½ | 59 | 14 | 34½ | Considerably. |
| 44 | Milford White*.... | " 14. | 116 | 45—47 | Weak .. | 9—10½ | 59 | 14 | 35 | " |
| 45 | Big Four (Salzer's).... | " 16. | 118 | 41—43 | Stiff ... | 7½—8½ | 57 | 22 | 36 | " |
| 46 | Kendal Black*.... | " 15. | 117 | 48—50 | Weak .. | 8½—10 | 57 | 22 | 35 | Badly. |
| 47 | Prolific Black Tartarian... | " 15. | 117 | 48—50 | " .. | 9½—11 | 57 | 2 | 35 | " |
| 48 | Flying Scotchman.... | " 15. | 117 | 42—44 | " .. | 6—7½ | 56 | 16 | 35½ | " |
| 49 | Bavarian.... | " 13. | 115 | 41—43 | " .. | 7—8½ | 56 | 16 | 35 | Slightly. |
| 50 | American Beauty.... | " 15. | 117 | 46—48 | " .. | 7½—9 | 55 | 30 | 36 | Badly. |
| 51 | Joanette (black).... | " 16. | 118 | 37—39 | Medium | 7—8¼ | 55 | 10 | 36½ | Considerably. |
| 52 | Holstein Prolific.... | " 14. | 116 | 38—40 | Stiff ... | 7½—9½ | 55 | 10 | 35½ | " |
| 53 | Thousand Dollar.... | " 15. | 117 | 44—46 | Medium | 7½—9 | 55 | 10 | 36 | Badly. |
| 54 | Buckbee's Illinois.... | " 17. | 119 | 40—42 | " .. | 7¼—8¼ | 54 | 24 | 36½ | Considerably. |
| 55 | Sheffield Standard.... | " 17. | 119 | 40—42 | " .. | 7½—8½ | 52 | 32 | 37 | Badly. |
| 56 | White Russian.... | " 14. | 116 | 39—41 | Weak .. | 6½—7½ | 51 | 26 | 36 | " |
| 57 | Milford Black*.... | " 15. | 117 | 45—47 | " .. | 7½—9½ | 51 | 6 | 35½ | " |
| 58 | New Zealand.... | " 18. | 120 | 46—48 | Medium | 7¼—9 | 50 | .. | 36½ | " |
| 59 | Anderbecker.... | " 16. | 118 | 38—40 | " .. | 7—8¼ | 50 | .. | 35 | Considerably. |
| 60 | White Schonen.... | " 12. | 114 | 44—46 | " .. | 8—9½ | 48 | 8 | 35 | Slightly. |
| 61 | Pioneer (black).... | " 16. | 118 | 37—39 | Weak .. | 7½—8½ | 48 | 8 | 36 | Badly. |
| 62 | Early Golden Prolific.... | " 14. | 116 | 42—44 | Medium | 8—9½ | 47 | 22 | 37 | Considerably. |
| 63 | Wallis.... | " 13. | 115 | 43—45 | " .. | 7½—9 | 44 | 4 | 35½ | " |
| 64 | Pense Black*.... | " 15. | 117 | 43—45 | " .. | 7½—9 | 41 | 6 | 36 | Badly. |
| 65 | Chinese Naked.... | " 20. | 125 | 50—52 | Stiff ... | 9½—11 | 31 | 26 | 46½ | " |

* Cross-bred varieties produced at the Experimental Farms.

*Most Productive Varieties of Oats.*—Taking the average of the returns for a series of years, the varieties of oats found to be the most productive at this Farm are White Giant, Holstein Prolific, Banner, Columbus, Mennonite, Golden Giant, American Triumph, Joannette, Black Beauty and Golden Beauty.

*Earliest Varieties of Oats.*—Wallis is the earliest variety which has been grown at this Farm for the past five years. It ripens, as a rule, about two or three days earlier than White Giant or Banner, but is very much less productive.

Welcome and White Wonder, which were discontinued from the plots at this Farm some years ago on account of their small yield, ripen as a rule about five or six days earlier than Wallis.

## SIX-ROW BARLEY.

The plots were all one-fortieth of an acre in extent. The seed was sown at the rate of 1¾ bushels per acre, the date of sowing being April 18.

The yield per acre is expressed in 'bushels' of 48 lbs.

### SIX-ROW BARLEY—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | Number of Days Maturing. | Length of Straw, including Head. | Character of Straw. | Length of Head. | Yield per Acre. | | Weight per Measured Bushel after Cleaning. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Inches. | | Inches. | Bush. | Lbs. | Lbs. | |
| 1 | Blue Long Head.......... | July 25 | 98 | 34—36 | Weak... | 2½—3¼ | 58 | 36 | 47 | Considerably. |
| 2 | Summit*... ...... ...... | " 25 | 98 | 46—48 | Medium | 3¼—3¾ | 54 | 28 | 49½ | Slightly. |
| 3 | Brome*................ | " 27 | 100 | 40—42 | Weak... | 3 —3½ | 53 | 36 | 49½ | " |
| 4 | Silver King ....... ... .. | Aug. 2 | 106 | 32—34 | Medium | 3¼—4 | 53 | 16 | 49½ | " |
| 5 | Trooper*............... | July 26 | 99 | 39—41 | Stiff.... | 2¾—3¼ | 52 | 4 | 49½ | " |
| 6 | Garfield*................ | " 25 | 98 | 44—46 | Medium | 2¾—3¼ | 52 | 4 | 50½ | " |
| 7 | Stella*... ............... | " 25 | 98 | 44—46 | " . | 3 —3½ | 51 | 12 | 48½ | " |
| 8 | Albert*........ ........ | Aug. 2 | 106 | 34—36 | " . | 3¼—3¾ | 47 | 4 | 48 | " |
| 9 | Empire*................ | July 27 | 100 | 37—39 | " . | 2¼—2¾ | 45 | 20 | 50 | " |
| 10 | Baxter ..... ............ | " 24 | 97 | 41—43 | " . | 2 —2½ | 45 | 20 | 49½ | " |
| 11 | Yale*.................... | " 27 | 100 | 37—39 | " . | 2½—3 | 45 | .. | 50 | " |
| 12 | Odessa.................. | " 27 | 100 | 35—37 | " . | 2¾—3½ | 44 | 28 | 48 | " |
| 13 | Common................. | " 25 | 98 | 36—38 | Weak... | 2¾—3¼ | 44 | 28 | 47½ | " |
| 14 | Norwegian (No. 8)........ | " 26 | 99 | 38—40 | " . | 2¼—2¾ | 44 | 28 | 49 | " |
| 15 | Oderbruch............... | " 27 | 100 | 35—37 | Medium | 2½—3¼ | 42 | 44 | 49 | " |
| 16 | Rennie's Improved........ | " 25 | 98 | 35—37 | Weak... | 2¼—2¾ | 42 | 44 | 49 | " |
| 17 | Nugent*................. | Aug. 3 | 107 | 31—33 | Stiff.... | 3 —3¾ | 42 | 4 | 48½ | " |
| 18 | Royal*. ........... .... | " 2 | 106 | 35—37 | " .... | 2¾—3¼ | 41 | 12 | 48½ | " |
| 19 | Champion (beardless).... | July 23 | 96 | 40—42 | Weak... | 3 —3¾ | 40 | 20 | 48 | " |
| 20 | Mensury ............... | Aug. 1 | 105 | 35—37 | Stiff.... | 3¾—4¼ | 38 | 36 | 49 | " |
| 21 | Sisolsk................... | July 24 | 97 | 34—36 | Weak... | 2½—3¼ | 38 | 36 | 46 | Considerably. |
| 22 | Claude*................. | Aug. 3 | 107 | 27—29 | Medium | 2½—3 | 35 | 40 | 49 | " |
| 23 | Argyle*.................. | July 27 | 100 | 28—30 | Stiff.... | 2¾—3¼ | 34 | 28 | 49 | Slightly. |
| 24 | Mansfield*.............. | " 27 | 100 | 27—29 | Medium | 2 —2¾ | 34 | 28 | 49 | Considerably. |
| 25 | Chinese Hulless .......... | " 31 | 104 | 25—27 | " . | 2 —2¾ | 25 | 40 | 59½ | " |
| 26 | Hulless Black............ | " 23 | 96 | 26—28 | Weak... | 1½—2 | 25 | 20 | 60 | " |

*Cross-bred varieties produced at the Experimental Farms.

*Most Productive Varieties of Six-row Barley.*—Taking the average of the returns for a series of years, the varieties of six-row barley found to be the most productive at this Farm are Odessa, Blue Long Head, Mensury, Stella and Trooper.

*Earliest Varieties of Six-row Barley.*—There are no important differences in earliness to be noted among those varieties of six-row barley which have been tested for five years or longer at this Farm. Odessa, Stella and Trooper are about one day earlier than Blue Long Head and Mensury.

## TWO-ROW BARLEY.

Attention is called to two new varieties of two-row barley, imported this year, Maltster and Brewer's Favourite. The original seed of both of these was very plump, and weighed 54¾ lbs. to the measured bushel. It will be seen that Maltster has given a good yield of heavy grain, but Brewer's Favourite has not done remarkably well. These varieties were originated by Garton Bros., England.

The plots of two-row barley were sown on April 17, the seed being used at the rate of two bushels to the acre. The yield given is calculated from one-fortieth of an acre except in the case of Princess Sialof, where only one-eightieth of an acre is used, as one-half of the plot ripened somewhat earlier than the other.

The yield per acre is expressed in 'bushels' of 48 lbs.

TWO-ROW BARLEY—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | Number of Days Maturing. | Length of Straw, including Head. | Character of Straw. | Length of Head. | Yield per Acre. | | Weight per Measured Bushel after Cleaning. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Inches. | | Inches. | Bush. | Lbs. | Lbs. | |
| 1 | Maltster | Aug. 11 | 116 | 37—39 | Medium | 3 —3¾ | 48 | 36 | 52¼ | Slightly. |
| 2 | Princess Sialof | " 4 | 109 | 31—33 | " | 3¾—4¼ | 48 | 16 | 49 | Badly. |
| 3 | Canadian Thorpe | " 2 | 107 | 38—40 | Stiff | 3 —3½ | 46 | 32 | 50½ | Slightly. |
| 4 | Invincible | July 31 | 105 | 36—38 | " | 2¾—3¼ | 46 | 32 | 52 | " |
| 5 | Jarvis* | Aug. 1 | 106 | 45—47 | " | 4¼—4¾ | 46 | 12 | 52¼ | " |
| 6 | French Chevalier | July 31 | 105 | 33—35 | Medium | 3½—4¼ | 44 | 28 | 50¼ | " |
| 7 | Besthorn's Kaiser | Aug. 3 | 108 | 36—38 | Stiff | 2¾—3¼ | 43 | 36 | 51½ | " |
| 8 | Plumage | " 1 | 106 | 36—38 | " | 2½—3 | 43 | 16 | 53 | " |
| 9 | Beaver* | July 30 | 104 | 45—47 | " | 3¼—3¾ | 42 | 24 | 51 | Considerably. |
| 10 | Gordon* | Aug. 1 | 106 | 38—40 | " | 2¾—3¼ | 41 | 32 | 51 | Slightly. |
| 11 | Harvey* | Aug. 4 | 109 | 38—40 | Medium | 3¾—4¼ | 40 | .. | 52 | Considerably. |
| 12 | Fichtel Mountain | July 30 | 104 | 28—30 | " | 2¾—3¼ | 39 | 28 | 48 | " |
| 13 | Sidney* | Aug. 2 | 107 | 38—40 | Stiff | 3½—4 | 39 | 8 | 52 | Slightly. |
| 14 | Dunham* | " 3 | 108 | 40—42 | " | 3¼—3¾ | 37 | 44 | 51½ | " |
| 15 | Danish Chevalier | " 2 | 107 | 41—43 | " | 4¼—4¾ | 37 | 4 | 50 | Considerably. |
| 16 | Fulton* | " 3 | 108 | 36—38 | Medium | 3 —3½ | 37 | 4 | 50 | " |
| 17 | Logan* | Aug. 4 | 109 | 40—42 | " | 3¼—3¾ | 37 | 4 | 52¼ | Slightly. |
| 18 | Clifford* | " 4 | 109 | 37—39 | " | 3¼—3¾ | 36 | 32 | 51 | Considerably. |
| 19 | Brewer's Favourite | " 11 | 116 | 32—34 | " | 3¼—4 | 35 | 40 | 52 | Slightly. |
| 20 | Standwell | " 4 | 109 | 40—42 | " | 2¾—3¼ | 35 | .. | 51 | " |
| 21 | Pelham* | July 28 | 102 | 33—35 | " | 3 —3½ | 34 | 28 | 52 | " |
| 22 | Newton | Aug. 3 | 108 | 35—37 | Stiff | 2¾—3¼ | 31 | 12 | 51½ | " |

* Cross-bred varieties produced at the Experimental Farms.

*Most Productive Varieties of Two-row Barley.*—Taking the average of the returns for a series of years, the varieties of two-row barley found to be the most productive at this Farm are: Canadian Thorpe, French Chevalier, Beaver and Danish Chevalier.

*Earliest Varieties of Two-row Barley.*—The earliest varieties of two-row barley grown at this Farm are Jarvis, Beaver, Gordon. These are all cross-bred sorts produced here. They ripen, as a rule, two or three days earlier than Canadian Thorpe and French Chevalier.

## PEASE.

The plots of pease were one-fortieth of an acre each. The seed was sown on April 22, at the rate of from two to three bushels per acre, according to the size of the pea. The yield per acre is expressed in 'bushels' of 60 pounds.

### PEASE—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | Number of Days maturing. | Character of growth. | Length of Straw. | Length of Pod. | Yield per Acre. | | Weight per Measured bushel after Cleaning. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Inches. | Inches. | Bush. | Lbs. | Lbs. |
| 1 | English Gray | Aug. 21.. | 121 | Strong. | 67—70 | 2¼—3 | 34 | 20 | 55¾ |
| 2 | Crown | 〃 19.. | 119 | 〃 | 47—50 | 2¼—2¾ | 34 | .. | 60½ |
| 3 | Prussian Blue | 〃 18.. | 118 | 〃 | 62—65 | 2 —2½ | 33 | 40 | 62 |
| 4 | Golden Vine | 〃 21.. | 121 | 〃 | 57—60 | 2 —2½ | 32 | 40 | 61 |
| 5 | Daniel O'Rourke | 〃 18.. | 118 | 〃 | 62—65 | 1¾—2¼ | 32 | .. | 61½ |
| 6 | Paragon* | 〃 17.. | 117 | Medium | 33—36 | 2¼—2¾ | 31 | 20 | 61½ |
| 7 | Victoria* | 〃 25.. | 125 | Strong. | 70—73 | 2 —2¾ | 31 | 20 | 60½ |
| 8 | Picton* | 〃 22.. | 122 | 〃 | 65—68 | 2 —2½ | 31 | .. | 61¼ |
| 9 | Gregory* | 〃 20.. | 120 | 〃 | 63—66 | 2¼—2¾ | 30 | 40 | 61 |
| 10 | Duke* | 〃 20.. | 120 | 〃 | 70—73 | 2¼—2¾ | 30 | 40 | 61½ |
| 11 | Bruce* | 〃 22.. | 122 | 〃 | 72—75 | 2¼—2¾ | 30 | 40 | 61½ |
| 12 | Chancellor | 〃 18.. | 118 | Medium | 60—63 | 1½—2¼ | 30 | 20 | 60½ |
| 13 | Mummy | 〃 22.. | 122 | 〃 | 59—62 | 2 —2½ | 30 | .. | 60¾ |
| 14 | Perth* | 〃 18.. | 118 | Strong. | 61—64 | 2¼—3 | 29 | .. | 61½ |
| 15 | Kent* | 〃 23.. | 123 | 〃 | 67—70 | 2½—3¼ | 29 | .. | 60½ |
| 16 | Pride | 〃 22.. | 122 | 〃 | 50—53 | 2¼—2¾ | 28 | 40 | 61 |
| 17 | Cooper* | 〃 17.. | 117 | Medium | 62—65 | 2¼—2¾ | 28 | .. | 61 |
| 18 | Trilby* | 〃 18.. | 118 | Strong. | 63—66 | 2¼—2¾ | 27 | 40 | 62 |
| 19 | Archer* | 〃 23.. | 123 | 〃 | 70—73 | 1¾—2¼ | 27 | 20 | 62 |
| 20 | German White | 〃 20.. | 120 | 〃 | 67—70 | 2 —2½ | 27 | 20 | 61 |
| 21 | King* | 〃 21.. | 121 | 〃 | 64—67 | 2¼—2¾ | 27 | 20 | 61 |
| 22 | White Marrowfat (Large) | 〃 19.. | 119 | 〃 | 67—70 | 2½—3 | 27 | 20 | 60½ |
| 23 | Prince Albert | 〃 19.. | 119 | 〃 | 63—66 | 2½—3 | 26 | 20 | 61¼ |
| 24 | Prince* | 〃 23.. | 123 | 〃 | 72—75 | 2¼—2¾ | 26 | 20 | 60¾ |
| 25 | Alma* | 〃 17.. | 117 | 〃 | 60—63 | 2¼—2¾ | 26 | .. | 59 |
| 26 | Canadian Beauty | 〃 18.. | 118 | 〃 | 65—68 | 2½—3 | 26 | .. | 62 |
| 27 | Wisconsin Blue | 〃 19.. | 119 | 〃 | 57—60 | 2 —2½ | 25 | 40 | 62 |
| 28 | Pearl* | 〃 19.. | 119 | 〃 | 57—60 | 2¼—2¾ | 25 | 20 | 61¼ |
| 29 | Early Britain | 〃 22.. | 122 | 〃 | 69—72 | 2¼—2¾ | 24 | 40 | 58½ |
| 30 | New Potter | 〃 19.. | 119 | 〃 | 67—70 | 2 —2½ | 23 | 40 | 61½ |
| 31 | Elliot* | 〃 20.. | 120 | 〃 | 68—71 | 2 —2½ | 23 | 20 | 61½ |
| 32 | Lanark* | 〃 19.. | 119 | 〃 | 60—63 | 1¾—2¼ | 23 | 20 | 60½ |
| 33 | Agnes* | 〃 19.. | 119 | 〃 | 62—65 | 1¾—2¼ | 23 | .. | 61½ |
| 34 | Carleton* | 〃 23.. | 123 | 〃 | 60—63 | 2¼—2¾ | 23 | .. | 61¼ |
| 35 | Macoun* | 〃 20.. | 120 | 〃 | 61—64 | 2¼—2¾ | 23 | .. | 61½ |
| 36 | Black-eyed Marrowfat | 〃 18.. | 118 | 〃 | 60—63 | 2¼—3 | 22 | 40 | 61 |
| 37 | White Wonder | 〃 16.. | 116 | Medium | 38—40 | 2¼—2¾ | 22 | 40 | 61 |
| 38 | Arthur* | 〃 18.. | 118 | Strong. | 59—62 | 2¼—3 | 22 | 40 | 61½ |
| 39 | Field Gray | 〃 17.. | 117 | Medium | 57—60 | 1¾—2¼ | 22 | .. | 57¾ |
| 40 | Fergus* | 〃 20.. | 120 | Strong. | 60—63 | 2¼—2¾ | 21 | .. | 61¼ |
| 41 | Centennial | 〃 22.. | 122 | 〃 | 67—70 | 2 —2¾ | 20 | 40 | 60 |
| 42 | Mackay* | 〃 20.. | 120 | 〃 | 65—68 | 2¼—3 | 20 | .. | 61½ |
| 43 | Nelson* | 〃 19.. | 119 | Medium | 47—50 | 2 —2½ | 15 | 40 | 61 |

* Cross-bred varieties produced at the Experimental Farms.

*Most Productive Varieties of Pease.*—Taking the average of the returns for a series of years, the varieties of pease found to be most productive at this Farm are Arthur and Paragon.

*Earliest Varieties of Peas.*—Chancellor and White Wonder ripen, as a rule, about two days earlier than Paragon and Arthur. Chancellor gives a good crop, but White Wonder gives a light yield.

## SPRING RYE.

One plot of spring rye (one-fortieth acre) was sown on April 17, the seed being used at the rate of one and one-half bushels to the acre. The rye made a strong and fairly even growth, and ripened on August 10. The straw was stiff, its length (including the head) being 53 to 55 inches. The length of the heads was from three to three and three-quarter inches. The number of days from sowing to harvesting was 115. The yield, expressed in 'bushels' of 56 pounds, was 21 bushels 24 pounds per acre; and the weight per measured bushel (after cleaning) was 55 pounds.

## SOJA BEANS.

Two plots of one-fortieth acre each were sown in rows at different distances apart, viz.: 21 and 28 inches, to gain information as to the best distance for sowing. The soil was a light sandy loam, which received a dressing of barn-yard manure during the winter of 1899 and 1900 of about 12 tons per acre. The previous crop was horse beans. After the beans were cut the land was ploughed late in the autumn to the depth of about seven or eight inches, and left in that condition until the following spring, when it was cultivated once with a two-horse cultivator and twice with a smoothing harrow. The beans were sown with a seed-drill on May 9, and cut on September 22. Half of each plot was cut green, when the pods were well formed, but the beans were still soft. The other half of each plot was allowed to ripen.

Plot 1.—Sown in rows 21 inches apart; growth strong and even, leafy; average height, 32 to 37 inches; total yield of green crop, 12 tons 960 lbs. per acre; yield of beans, 14 bushels 40 lbs. per acre.

Plot 2.—Sown in rows 28 inches apart; growth very strong and leafy; average height 34 to 38 inches. Plot all standing; stalks considerably stiffer than in plot No. 1. Total yield of green crop, 15 tons 1,200 lbs per acre; yield of beans, 13 bushels 20 lbs. per acre.

## HORSE BEANS.

Two plots of one-fortieth acre each were sown in rows at different distances apart, viz.: 21 and 28 inches, to gain information as to the best distance for sowing. The land was adjoining that used for soja beans, was similar in quality and received the same treatment. The previous crop was flax. The beans were sown with the seed drill on May 9, and cut on September 22.

Half of each plot was cut green before the beans were ripe. The other half of each plot was allowed to ripen.

Plot 1.—Sown in rows 21 inches apart; growth strong, pods fairly numerous; height 50 to 52 inches; crop all standing. Total yield, 13 tons 560 lbs. per acre. Yield of beans, 20 bushels 40 lbs. per acre.

Plot 2.—Sown in rows 28 inches apart; growth very strong; pods numerous; height 51 to 55 inches; crop all standing; stalks considerably stiffer than in plot No. 1. Total yield 13 tons 880 lbs. per acre. Yield of beans, 32 bushels per acre.

## MILLET.

The plots of millet were one-eightieth of an acre each. The seed was sown with a hand seed drill on May 19. The plots were cut when the seed was in the doughy state.

MILLET—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Cutting. | Length of Straw. | Character of Growth. | Weight per Acre, Green. | | Weight per Acre, Dry. | |
|---|---|---|---|---|---|---|---|---|
| | | | Inches. | | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Pearl or Cat-tail | Sept. 8 | 38—42 | Weak | 8 | 160 | 3 | 1,840 |
| 2 | Algerian | " 8 | 65—70 | " | 6 | 800 | 4 | 1,200 |
| 3 | Moha Hungarian | " 3 | 28—32 | Medium | 5 | 800 | 2 | 1,760 |
| 4 | White Round French | " 3 | 38—40 | " | 5 | ... | 2 | 1,360 |
| 5 | Red Orenburg | " 8 | 35—38 | " | 3 | 1,760 | 2 | 80 |
| 6 | Italian or Indian | " 6 | 54—58 | " | 3 | 1,680 | 1 | 960 |

## TURNIPS.

Two sowings were made of each variety, the first on May 7 and the second on May 21. The seed was used at the rate of about four pounds per acre. Before sowing, the land was made up in drills two feet apart and rolled with a heavy land roller, which flattened the drills nearly one-half, leaving a firm seed bed. When the young plants were about three inches high they were thinned out, leaving them about seven inches apart in the rows.

The roots were pulled on two different dates: October 19 and November 2. The yield per acre has been calculated from the weight of roots gathered from two rows, each 33 feet long.

The results obtained this season in the case of turnips and of other root crops do not altogether harmonise with those of previous years. This is no doubt due chiefly to two causes: first, the drought in spring, which delayed the germination of most of the seed of the first sowing, and second, the unusually severe frosts which occurred between October 19 and November 2.

In Canada the ton contains 2,000 lbs.

### TURNIPS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre from 1st Sowing, 1st Pulling. | | Yield per Acre from 2nd Sowing, 1st Pulling. | | Yield per Acre from 1st Sowing, 2nd Pulling. | | Yield per Acre from 2nd Sowing, 2nd Pulling. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | New Century | 47 | 1,865 | 23 | 1,850 | 50 | 1,970 | 24 | 345 |
| 2 | Jumbo | 46 | 235 | 24 | 1,665 | 46 | 400 | 25 | 325 |
| 3 | Kangaroo | 44 | 1,430 | 24 | 1,095 | 45 | 90 | 24 | 1,500 |
| 4 | Mammoth Clyde | 41 | 665 | 30 | 1,545 | 41 | 1,160 | 30 | 390 |
| 5 | Good Luck | 40 | 1,510 | 28 | 1,090 | 41 | 665 | 30 | 60 |
| 6 | Emperor Swede | 37 | 1,570 | 20 | 425 | 39 | 210 | 20 | 1,085 |
| 7 | Elephant's Master | 33 | 1,155 | 20 | 260 | 25 | 1,315 | 21 | 900 |
| 8 | Drummond Purple Top | 33 | 990 | 30 | 225 | 31 | 40 | 30 | 225 |
| 9 | Shamrock Purple Top | 33 | 825 | 26 | 965 | 34 | 805 | 26 | 1,955 |
| 10 | Magnum Bonum | 30 | 555 | 24 | 345 | 25 | 820 | 22 | 550 |
| 11 | Imperial Swede | 30 | 390 | 29 | 740 | 30 | 225 | 28 | 595 |
| 12 | Bangholm Selected | 29 | 905 | 24 | 15 | 20 | 755 | 23 | 1,850 |
| 13 | Selected Purple Top | 29 | 575 | 28 | 1,915 | 32 | 1,340 | 24 | 345 |
| 14 | Hartley's Bronze | 29 | 245 | 27 | 780 | 24 | 1,665 | 25 | 1,315 |
| 15 | Carter's Elephant | 27 | 120 | 17 | 320 | 25 | 490 | 20 | 1,745 |
| 16 | Sutton's Champion | 26 | 1,625 | 24 | 1,830 | 27 | 285 | 28 | 1,750 |
| 17 | Perfection Swede | 25 | 1,975 | 24 | 1,005 | 29 | 1,565 | 24 | 1,170 |
| 18 | Skirvings | 25 | 1,480 | 19 | 445 | 23 | 1,190 | 20 | 1,415 |
| 19 | East Lothian | 23 | 1,520 | 23 | 860 | 26 | 1,790 | 24 | 840 |
| 20 | Halewood's Bronze Top | 23 | 1,520 | 21 | 1,890 | 28 | 1.420 | 26 | 1.790 |
| 21 | Hall's Westbury | 23 | 695 | 19 | 1,270 | 26 | 1,460 | 15 | 1,515 |

| | Tons. | Lbs. |
|---|---|---|
| The average yield from the 1st sowing, 1st pulling, was | 32 | 1,126 |
| The average yield from the 1st sowing, 2nd pulling, was | 32 | 460 |
| The average yield from the 2nd sowing, 1st pulling, was | 24 | 974 |
| The average yield from the 2nd sowing, 2nd pulling, was | 24 | 1,508 |

## MANGELS.

Two sowings were made of each variety, the first on May 7, and the second on May 21. The seed was used at the rate of about six pounds per acre. Before sowing, the land was made up in drills two feet apart and rolled with a heavy land roller to make a firm seed bed. When the young plants were about three inches high they were thinned out, leaving them about seven inches apart in the rows. The roots were pulled on two different dates: October 19 and November 2. The yield has been calculated in each case from the weight of roots gathered from two rows, each 33 feet long.

MANGELS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre from 1st Sowing, 1st Pulling. | | Yield per Acre from 2nd Sowing, 1st Pulling. | | Yield per Acre from 1st Sowing, 2nd Pulling. | | Yield per Acre from 2nd Sowing, 2nd Pulling. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Mammoth Long Red | 41 | 335 | 21 | 900 | 37 | 745 | 20 | 1,250 |
| 2 | Triumph Yellow Globe | 40 | 190 | 18 | 1,125 | 32 | 1,505 | 14 | 1,040 |
| 3 | Selected Yellow Globe | 39 | 375 | 17 | 815 | 39 | 1,200 | 17 | 1,640 |
| 4 | Half Long Sugar White | 35 | 620 | 15 | 1,350 | 34 | 1,300 | 15 | 1,185 |
| 5 | Gate Post | 34 | 1,795 | 20 | 1,580 | 36 | 1,590 | 26 | 140 |
| 6 | Mammoth Yellow Intermediate | 34 | 1,630 | 15 | 1,845 | 37 | 1,240 | 20 | 590 |
| 7 | Giant Sugar Mangel | 34 | 1,135 | 15 | 1,680 | 30 | 885 | 17 | 650 |
| 8 | Giant Yellow Intermediate | 34 | 475 | 17 | 815 | 43 | 130 | 16 | 340 |
| 9 | Prize Winner Yellow Globe | 32 | 845 | 18 | 630 | 26 | 1,625 | 16 | 1,330 |
| 10 | Prize Mammoth Long Red | 32 | 350 | 20 | 1,250 | 46 | 1,720 | 21 | 75 |
| 11 | Lion Yellow Intermediate | 30 | 225 | 19 | 1,435 | 46 | 70 | 19 | 1,270 |
| 12 | Yellow Intermediate | 29 | 1,730 | 14 | 495 | 39 | 1,035 | 25 | 820 |
| 13 | Half Long Sugar Rosy | 29 | 740 | 14 | 215 | 22 | 220 | 13 | 1,720 |
| 14 | Giant Yellow Globe | 25 | 1,645 | 16 | 1,990 | 34 | 310 | 20 | 1,415 |
| 15 | Selected Mammoth Long Red | 24 | 1,500 | 22 | 385 | 31 | 1,030 | 26 | 965 |
| 16 | Leviathan Long Red | 23 | 200 | 13 | 1,885 | 24 | 180 | 15 | 690 |

| | Tons. | Lbs. |
|---|---|---|
| The average yield from the 1st sowing, 1st pulling, was | 32 | 1,237 |
| The average yield from the 1st sowing, 2nd pulling, was | 35 | 424 |
| The average yield from the 2nd sowing, 1st pulling, was | 17 | 1,400 |
| The average yield from the 2nd sowing, 2nd pulling, was | 19 | 445 |

## CARROTS.

Two sowings were made of each variety, the first on May 7 and the second on May 21. The seed was used at the rate of about four pounds per acre. Before sowing, the land was made up in drills two feet apart and rolled with a heavy land roller to make a firm seed bed. When the young plants were about three inches high they were thinned out, leaving them about five inches apart in the rows. The roots were pulled on two different dates : October 19 and November 2. The yield has been calculated in each case from the weight of roots gathered from two rows, each 33 feet long.

CARROTS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre from 1st Sowing, 1st Pulling. | | Yield per Acre from 2nd Sowing, 1st Pulling. | | Yield per Acre from 1st Sowing, 2nd Pulling. | | Yield per Acre from 2nd Sowing, 2nd Pulling. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | New White Intermediate | 33 | 1,815 | 25 | 160 | 34 | 1,300 | 25 | 325 |
| 2 | Mammoth White Intermediate | 30 | 1,875 | 22 | 1,210 | 26 | 1,625 | 21 | 900 |
| 3 | Ontario Champion | 29 | 1,070 | 22 | 550 | 26 | 140 | 22 | 880 |
| 4 | Giant White Vosges | 29 | 80 | 21 | 570 | 31 | 370 | 21 | 570 |
| 5 | Improved Short White | 28 | 430 | 20 | 755 | 33 | 165 | 21 | 1,560 |
| 6 | White Belgian | 27 | 1,110 | 19 | 1,930 | 28 | 430 | 18 | 630 |
| 7 | Long Yellow Stump Rooted | 26 | 1,810 | 18 | 300 | 22 | 880 | 14 | 50 |
| 8 | Half Long White | 21 | 1,890 | 20 | 1,745 | 22 | 1,870 | 20 | 95 |
| 9 | Carter's Orange Giant | 21 | 1,065 | 18 | 135 | 24 | 1,995 | 17 | 1,640 |
| 10 | Half Long Chantenay | 21 | 75 | 16 | 175 | 23 | 1,685 | 19 | 1,765 |
| 11 | Early Gem | 16 | 1,495 | 15 | 1,020 | 20 | 1,580 | 17 | 1,310 |

| | Tons. | Lbs |
|---|---|---|
| The average yield from the 1st sowing, 1st pulling, was | 26 | 247 |
| The average yield from the 1st sowing, 2nd pulling, was | 26 | 1,640 |
| The average yield from the 2nd sowing, 1st pulling, was | 20 | 50 |
| The average yield from the 2nd sowing, 2nd pulling, was | 19 | 1,975 |

## SUGAR BEETS.

Two sowings were made of each variety, the first on May 7 and the second on May 21. The seed was used at the rate of about six pounds per acre. Before sowing, the land was made up in drills two feet apart and rolled with a heavy land roller to make a firm seed bed. When the young plants were about three inches high they were thinned out, leaving them about five inches apart in the rows. The roots were pulled on two different dates: October 19 and November 2. The yield has been calculated in each case from the weight of roots gathered from two rows, each 33 feet long. Though all the varieties mentioned here are commonly classed as sugar beets, it should be noted that the only ones recommended for use in the manufacture of sugar are Wanzleben, French Very Rich, and Vilmorin's Improved.

SUGAR BEETS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre from 1st Sowing 1st Pulling. | | Yield per Acre from 2nd Sowing 1st Pulling. | | Yield per Acre from 1st Sowing 2nd Pulling. | | Yield per Acre from 2nd Sowing 2nd Pulling. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Improved Imperial | 39 | 540 | 21 | 900 | 39 | 1,035 | 21 | 1,230 |
| 2 | Red Top Sugar | 36 | 105 | 20 | 920 | 31 | 370 | 14 | 380 |
| 3 | Danish Red Top | 35 | 455 | 16 | 1,495 | 32 | 1,670 | 15 | 525 |
| 4 | Danish Improved | 32 | 1,010 | 15 | 690 | 30 | 390 | 16 | 505 |
| 5 | Wanzleben | 29 | 1,565 | 13 | 70 | 30 | 1,545 | 13 | 1,060 |
| 6 | French Very Rich | 23 | 695 | 18 | 1,455 | 23 | 1,190 | 19 | 1,930 |
| 7 | Royal Giant | 20 | 1,250 | 15 | 1,185 | 27 | 450 | 18 | 630 |
| 8 | Vilmorin's Improved | 19 | 610 | 7 | 1,180 | 13 | 1,885 | 8 | 1,820 |

| | Tons. | Lbs. |
|---|---|---|
| The average yield from the 1st sowing, 1st pulling, was | 29 | 1,029 |
| The average yield from the 1st sowing, 2nd pulling, was | 28 | 1,317 |
| The average yield from the 2nd sowing, 1st pulling, was | 16 | 237 |
| The average yield from the 2nd sowing, 2nd pulling, was | 16 | 10 |

## INDIAN CORN.

The corn was sown with the seed drill in rows thirty-five inches apart, and was also sown in hills thirty-five inches apart each way. When the plants were about six inches high they were thinned out, leaving them from six to eight inches apart in the rows, and leaving four or five plants in each hill. The seed was sown May 27, and the corn was cut green for ensilage September 30. The yield has been calculated from the weight of crop cut from two rows, each 33 feet long.

For the making of ensilage the corn should be cut when the kernels are in the late milk or doughy stage; but the summer at Ottawa is not always warm enough to bring the later varieties to this state of maturity before it is necessary to cut the crop to avoid frost.

In Canada the ton contains 2,000 pounds.

### INDIAN CORN—TEST OF VARIETIES.

| Number. | Name of Variety. | Character of Growth. | Height. | Leafiness. | Condition when Cut. | Yield per Acre Grown in Rows. | | Yield per Acre Grown in Hills. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | In. | | | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Early Mastodon | Strong | 100-110 | Leafy | Late milk | 27 | 835 | 26 | 800 |
| 2 | King of the Earliest | " | 80- 90 | Very leafy | Early milk | 21 | 955 | 17 | 155 |
| 3 | Giant Prolific Ensilage | " | 80- 90 | Leafy | " | 20 | 755 | 18 | 300 |
| 4 | Mammoth Cuban | " | 85- 95 | Very leafy | " | 19 | 1,600 | 19 | 775 |
| 5 | Pride of the North | Very strong. | 95-105 | Leafy | " | 19 | 500 | 18 | 1,290 |
| 6 | Early Butler | Strong | 90-100 | Very leafy | " | 19 | 280 | 19 | 500 |
| 7 | Compton's Early | Medium | 80- 90 | Leafy | Late milk | 18 | 1,840 | 17 | 1,860 |
| 8 | Champion White Pearl | Strong | 80- 90 | Very leafy | Early milk | 18 | 355 | 17 | 1,200 |
| 9 | Selected Leaming | " | 80- 90 | " | " | 17 | 1,970 | 16 | 10 |
| 10 | Thoro'bred White Flint | Very strong. | 95-105 | " | " | 17 | 1,200 | 17 | 540 |
| 11 | Red Cob Ensilage | " | 95-105 | " | " | 17 | 100 | 14 | 160 |
| 12 | Superior Fodder | " | 90-100 | " | " | 16 | 780 | 16 | 340 |
| 13 | Cloud's Early Yellow | " | 85- 95 | " | " | 16 | 560 | 15 | 1,955 |
| 14 | Sanford | Medium | 85- 95 | Medium | Late milk | 15 | 1,570 | 13 | 1,500 |
| 15 | White Cap Yellow Dent | " | 80- 90 | Leafy | Early milk | 15 | 1,460 | 12 | 1,300 |
| 16 | Salzer's All Gold | " | 75- 85 | Very leafy | " | 15 | 1,460 | 14 | 1,810 |
| 17 | Longfellow | " | 65- 75 | Medium | Late milk | 15 | 1,240 | 14 | 1,260 |
| 18 | Mammoth Eight-rowed Flint | " | 70- 75 | " | " | 15 | 140 | 13 | 1,720 |
| 19 | North Dakota White | Strong | 85- 95 | Very leafy | " | 14 | 1,700 | 15 | 1,515 |
| 20 | Eureka | Medium | 75- 85 | " | Early milk | 14 | 1,370 | 14 | 930 |
| 21 | Evergreen Sugar | " | 75- 85 | Medium | " | 14 | 600 | 13 | 1,555 |
| 22 | Angel of Midnight | " | 75- 85 | " | Late milk | 13 | 180 | 12 | 860 |
| 23 | King Philip | " | 65- 75 | " | Early milk | 11 | 1,100 | 11 | 1,760 |

The average yield from the rows was 17 tons 502 pounds per acre, and from the hills, 16 tons 352 pounds per acre; showing an advantage, this season, of 1 ton 150 pounds per acre in favour of the corn grown in rows.

### INDIAN CORN SOWN AT DIFFERENT DISTANCES.

Three varieties were chosen for this test: Champion White Pearl, Selected Leaming and Longfellow. The seed was sown May 27 and the corn was cut for ensilage September 30. Sixteen rows of each variety were sown, that is, four rows at each of the distances mentioned, and the yield per acre has been calculated from the weight of crop obtained from the two inner rows in each case. The length of the portions of the rows cut for weighing was 33 feet.

| Name of Variety. | Distance between the Rows. | Character of Growth. | Height when Cut. | Condition when Cut. | Yield per Acre. | |
|---|---|---|---|---|---|---|
| | In. | | In. | | Tons. | Lbs. |
| Champion White Pearl | 21 | Medium | 70—80 | Early milk | 28 | 1,078 |
| " " | 28 | Strong | 75—85 | " | 22 | 626 |
| " " | 35 | " | 85—95 | " | 19 | 665 |
| " " | 42 | " | 85—95 | " | 14 | 1,140 |
| Selected Leaming | 21 | " | 70—80 | " | 31 | 181 |
| " | 28 | " | 80—90 | " | 21 | 1,287 |
| " | 35 | Very strong. | 85 —95 | " | 17 | 375 |
| " | 42 | " " | 85—95 | " | 17 | 733 |
| Longfellow | 21 | Weak | 55—65 | Late milk | 15 | 1,752 |
| " | 28 | " | 55—65 | " | 14 | 1,469 |
| " | 35 | Medium | 60—70 | " | 14 | 820 |
| " | 42 | " | 70—80 | " | 14 | 59 |

It will be seen that, in every case, the largest yield per acre was obtained from the rows which were closest together. In previous years this has not always been so. The character of the season has evidently an important influence on the results.

## GRAIN SOWN IN DIFFERENT QUANTITIES PER ACRE ON SANDY LOAM.

These experiments were all conducted on plots of one-fortieth of an acre each. The wheat was sown on April 25 and was ripe on August 11. The oats were sown April 25 and were ripe August 11. The barley was sown April 25 and was ripe August 8.

The results of the tests in previous years are published, for comparison, along with the figures obtained this year.

| Name of Variety. | Quantity Sown per Acre. | Number of Days from Sowing to Harvesting. | | | Yie'd Per Acre. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1901. | 1902. | 1903. | 1901. | | 1902. | | 1903. | |
| | | | | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| Preston Wheat........... | 1 bushel.... | 100 | 108 | 108 | 10 | 20 | 24 | .. | 15 | .. |
| " " ......... | 1¼ bushels... | 100 | 108 | 108 | 15 | .. | 20 | 40 | 14 | 20 |
| " " ......... | 1½ " .. | 100 | 108 | 108 | 19 | 40 | 15 | 20 | 20 | 40 |
| " " ........ | 2 " .. | 100 | 108 | 108 | 20 | 20 | 10 | 40 | 15 | 20 |
| " " ......... | 2½ " .. | 100 | 108 | 108 | 21 | .. | 20 | 40 | 13 | 20 |
| " " ........ | 3 " .. | 100 | 108 | 108 | 19 | 40 | 17 | 20 | 16 | 40 |
| Banner Oats............ | 1½ " .. | 96 | 107 | 108 | 41 | 6 | 60 | .. | 63 | 18 |
| " " ........... | 2 " .. | 96 | 107 | 108 | 59 | 14 | 45 | 30 | 56 | 16 |
| " " ........... | 2½ " .. | 96 | 107 | 108 | 57 | 2 | 52 | 32 | 79 | 14 |
| " " ........ | 3 " .. | 96 | 107 | 108 | 43 | 18 | 50 | 20 | 84 | 4 |
| " " ........... | 3½ " .. | 96 | 107 | 108 | 31 | 26 | 50 | 20 | 88 | 8 |
| " " ........... | 4 " .. | 96 | 107 | 108 | 35 | 10 | 54 | 4 | 67 | 22 |
| Mensury Barley.......... | 1½ " .. | 84 | 95 | 105 | 35 | 35 | 40 | 40 | 61 | 32 |
| " " ......... | 2 " .. | 84 | 95 | 105 | 37 | 19 | 28 | 16 | 60 | .. |
| " " ......... | 2½ " .. | 84 | 95 | 105 | 43 | 11 | 27 | 24 | 54 | 28 |
| " " ......... | 3 " .. | 84 | 95 | 105 | 42 | 19 | 37 | 24 | 46 | 12 |
| " " ......... | 3½ " .. | 84 | 95 | 105 | 39 | 23 | 26 | 32 | 47 | 44 |
| " " ........ | 4 " .. | 84 | 95 | 105 | 43 | 11 | 45 | .. | 35 | 40 |

## GRAIN SOWN IN DIFFERENT QUANTITIES PER ACRE ON CLAY LOAM.

These experiments were all conducted on plots of one-fortieth of an acre each. The wheat was sown April 30 and was ripe August 16. The oats were sown April 30 and were ripe August 18. The barley was sown April 30 and was ripe August 11.

The results of the tests in previous years are published, for comparison, along with the figures obtained this year.

| Name of Variety. | Quantity Sown per Acre. | Number of Days from Sowing to Harvesting. | | | Yield Per Acre. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1901. | 1902. | 1903. | 1901. | | 1902. | | 1903. | |
| | | | | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| Preston Wheat | 1 bushel | 97 | 108 | 108 | 28 | 20 | 24 | 40 | 28 | 40 |
| " " | 1¼ bushels | 97 | 108 | 108 | 28 | 20 | 24 | 40 | 30 | .. |
| " " | 1½ " | 97 | 108 | 108 | 29 | .. | 29 | 20 | 30 | 40 |
| " " | 2 " | 97 | 108 | 108 | 26 | 20 | 28 | .. | 28 | .. |
| " " | 2½ " | 97 | 108 | 108 | 26 | 20 | 30 | .. | 29 | 40 |
| " " | 3 " | 97 | 108 | 108 | 25 | .. | 24 | 40 | 28 | 20 |
| Banner Oats | 1½ " | 92 | 111 | 110 | 58 | 28 | 63 | 18 | 72 | 32 |
| " " | 2 " | 92 | 111 | 110 | 65 | 30 | 62 | 12 | 78 | 28 |
| " " | 2½ " | 92 | 111 | 110 | 67 | 2 | 72 | 32 | 74 | 4 |
| " " | 3 " | 92 | 111 | 110 | 64 | 24 | 67 | 2 | 80 | 20 |
| " " | 3½ " | 92 | 111 | 110 | 61 | 6 | 70 | 20 | 84 | 24 |
| " " | 4 " | 92 | 111 | 110 | 57 | 22 | 67 | 2 | 88 | 23 |
| Mensury Barley | 1½ " | 83 | 99 | 103 | 37 | .. | 64 | 8 | 54 | 28 |
| " " | 2 " | 83 | 99 | 103 | 40 | 35 | 70 | 40 | 59 | 28 |
| " " | 2½ " | 83 | 99 | 103 | 44 | 3 | 68 | 16 | 48 | 16 |
| " " | 3 " | 83 | 99 | 103 | 45 | 35 | 69 | 8 | 50 | .. |
| " " | 3½ " | 83 | 99 | 103 | 45 | 35 | 65 | .. | 50 | .. |
| " " | 4 " | 83 | 99 | 103 | 44 | 3 | 62 | 24 | 58 | 16 |

## DOUBLE ROWS OF GRAIN.

Important varieties of cereals which have been rejected from the uniform test plots as undesirable for general cultivation are retained for reference purposes, and are grown annually; two rows of each variety being sown, the distance between the rows being about six inches, and the length of the rows 33 feet. Each pair of rows is separated from the neighbouring pairs by a space of about two feet. In these double rows are also sown the new varieties of grain originated at this farm which are available only in very small quantities and which are being propagated for larger plots. A few of the best standard sorts are also grown in the double rows for comparison with the other varieties.

These double rows form an interesting object lesson for visitors, presenting as they do a large number of distinct types in a very small area.

The accompanying plate gives a good idea of the appearance of these double rows in the early stages of growth.

# REPORT OF THE POULTRY MANAGER.

(A. G. GILBERT.)

OTTAWA, December 1, 1903.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I submit with pleasure the sixteenth annual report of the Poultry Department of the Central Experimental Farm.

Among other subjects, brought to the notice of the farmers as immediately affecting the poultry interests of the country, are the following:—

1. A rapidly growing demand for new laid eggs in winter and the superior quality of poultry flesh. Is the production in proportionate increase ?

2. Some obstacles to more rapid poultry development. How they may be overcome.

3. The detrimental practice (which is too common) of using birds of the smaller breeds for crossing, or for any other purpose, in preference to those of the utility pure breeds, such as Plymouth Rocks, Wyandottes, Orpingtons, &c., &c.

4. What experience has shown to be the best breeds for the farmer to adopt.

5. The value of building up strains of hardy fowls which will make good winter layers in cold houses, and the progeny of which will make early and rapid growing chickens. Instances of how this has been accomplished are given.

6. The experimental work of the year, in which is shown, in detail, the results of winter laying ; the hatching, rearing and proper feeding of chickens from incubator or nest to marketable age ; the summer and fall management of the young and old stock, and other information of practical import.

A feature of the past year was the high price of new laid eggs during the late summer and fall months. The probable cause of this—in the more general practice among farmers of causing their fowls to moult during the late summer months (the season of low value for eggs)—is pointed out in report, and the still further adoption of this business-like method is urged. It has been found from experience that in order to have fowls lay in winter it is necessary for them to moult during the summer, and as the moulting period is one of non-production it is wise to have that time of non-production when prices are lowest.

Some further experiments in the fattening of chickens in crate and pen, conducted by Mr. F. T. Shutt, chemist, will be found appended. It may be remembered that in experiments of a similar nature, carried on by the same gentleman last year, the advantage seemed to be with the birds kept in pens. This year the crate-kept birds make a slightly better showing. It will be interesting to note further results.

It is with gratification that I note the appointment of Mr. Victor Fortier, of St. Jerome, Que., as assistant in the management of the department under my charge. Mr. Fortier is an experienced poultry breeder and exhibitor, and his assistance will not only afford opportunity for extended usefulness of this department, but for the development of the poultry interests of the province of Quebec, the requirements of which, in this respect, he is so well acquainted.

I have much pleasure in again mentioning the faithful services of Mr. George Deavy, who has for a number of years past assisted me in the care and management of the birds under my charge.

It is to be hoped that the subjects discussed and the information given in this report will be found of practical value by the farmers of the country and act as incentives to greater effort in the production of eggs in winter and the superior quality of poultry flesh in summer, and for which there is such demand.

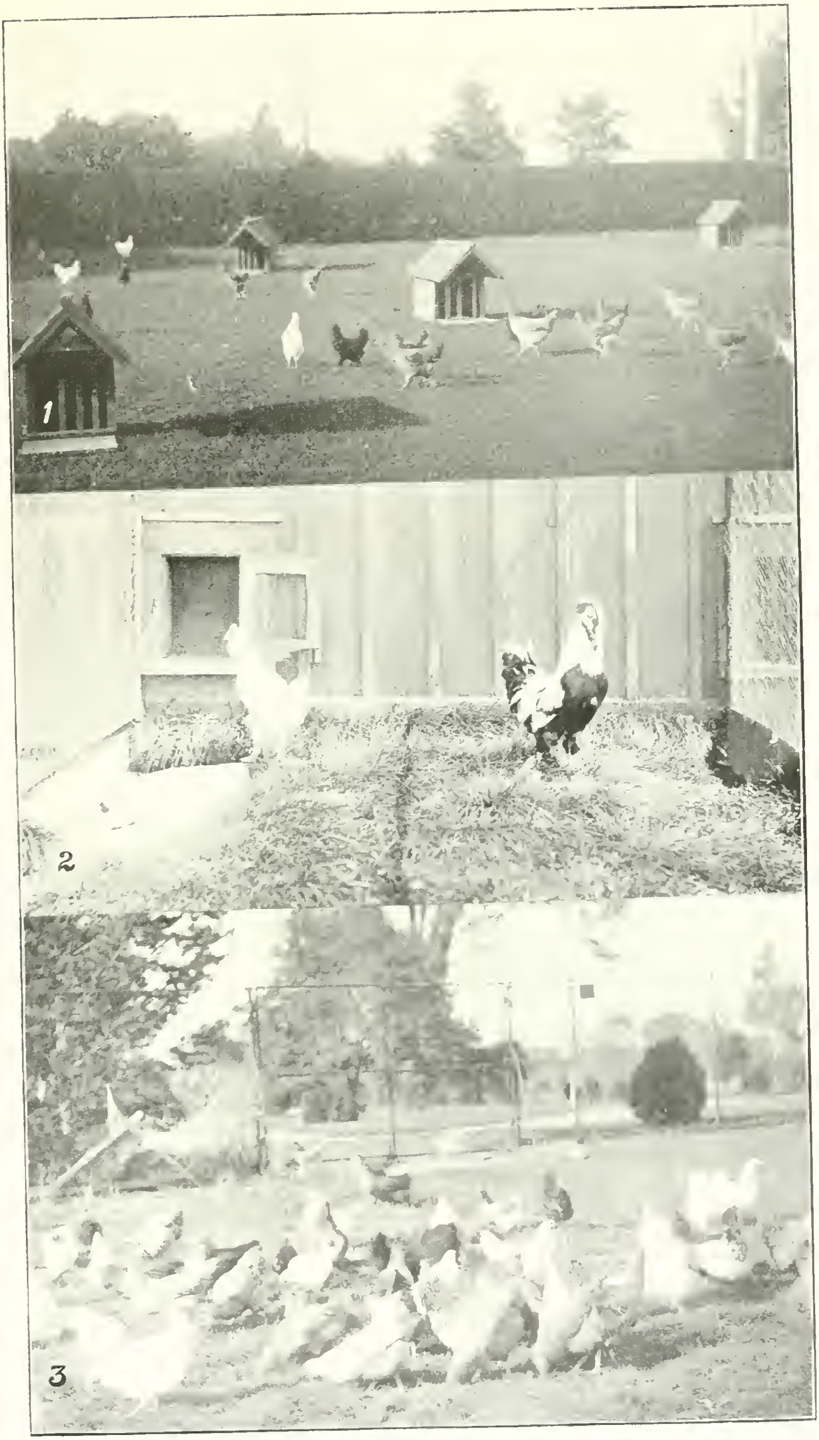
I have the honour to be, sir,
Your obedient servant,

A. G. GILBERT.

Seventeen years ago the first annual report of this department was distributed among the farmers of the country. It contained information as to the breeds best calculated to make winter egg-layers and rapid flesh-forming chickens during summer, so permitting opportunity to make money at both seasons of the year. While the benefit likely to accrue from such a course of action was freely admitted, there was yet—on the part of many persons—a feeling of misgiving which found expression in the exclamation, Oh ! but when the production of winter eggs and the superior quality of poultry is more general, prices will become so low as to be profitless.' Happily such pessimistic foreboding has not been realized. On the contrary prices have either remained stationary or advanced and this notwithstanding an increased production. Comparison with the winter prices of ten years ago and those of last winter will give proof of this. In the case of the city of Toronto, for instance, the advance, during recent years, in winter prices—in face of greatly increased production in the surrounding country—is most marked. In that city eight or ten years ago twenty-five cents would have been considered full value for a dozen of new laid eggs. Last winter the same quality and quantity of eggs sold for forty cents. A corresponding advance in the value of the superior quality of poultry may also be noted. Not only in the district surrounding Toronto has there been increased winter egg and superior quality of poultry production, but throughout the greater part of the Dominion. Why then should prices not have become lower? The answer at once suggests itself, that there has been a greater proportionate increase in the number of consumers. While this is doubtless correct, it is not the only reason. It may be interesting to note some of the causes which experience has shown to mitigate against a greater and more rapid production.

### WHY MORE RAPID POULTRY DEVELOPMENT DOES NOT TAKE PLACE.

Experimental work for many years has plainly shown that the obtaining of eggs in winter and a better class of poultry is not so easy as at first glance may seem. Success is dependent upon conditions which are not only more or less exacting according to location, but complete knowledge of which is imperative to success. This is not always realized. The numerous letters received by the writer from different points, show that many are anxious to get results before they know how to do so. And for that reason many try only to fail. On the part of the specialist expert knowledge is requisite. On the part of all, not only knowledge, but patience, perseverance, liking for the occupation and adaptability are necessary factors. Without them success is not likely to be attained.



(Photo. by F. T. Shutt.)

1. Small Colony-houses and Chickens. 2. Faverolle Cockerel and Hen. 3. Breeding Stock. One and two-year-old hens.

A drawback to successful poultry development is often met with in the enthusiast who establishes a plant, buys a number of birds and then writes for information as to proper methods of management and feeding, which should have been first thoroughly learned. A letter received some time ago may be quoted as a case in point. It is is as follows: 'DEAR SIR,—I recently had opportunity to purchase at a bargain one hundred Barred Plymouth Rock pullets and I did so. Will you please tell me how to successfully manage them.—J. M.'

It is hardly necessary to say that in such a case successful results are not likely to follow, and then poultry keeping is at once declared non-profitable.

Another drawback is the practice—frequently on the part of farmers—of keeping more fowls and the hatching of more chickens than can profitably be managed or reared. In report of last year methods of procedure calculated to lead to successful poultry keeping by farmers were given at length. It may be admissible to repeat in this connection, a suggestion made in that report to the effect that 'farmers should keep no more fowls than they can manage profitably, nor should they attempt to rear a greater number of chickens than circumstances will permit of their bringing to saleable age as early in the season as is possible.'

Another too common practice on the farms of the country and which retards poultry development—from winter eggs and better quality of flesh standpoints—is the keeping of 'scrub' stock. Doubtless the practice is not so general as it was, but it should be abandoned. It has been shown in previous reports that 'scrub' poultry are neither as good winter layers as pure bred birds, nor do their chickens make as valuable table fowls. Why have them? It is to be remembered that the cost of feeding a pure bred fowl is no more than that of the nondescript of much less value.

### FACTORS IN THE PRODUCTION OF THE SUPERIOR QUALITY OF POULTRY.

More particularly in regard to the superior quality of poultry there is found, as in the case of winter eggs, a far greater demand than there is supply. The demand is from both home and foreign market. That a superior quality of poultry suited to the most exacting tastes of home, or, British market can be produced by the farmers of the country has been demonstrated by the number and quality of the chickens grown in our poultry department and many of which have been killed, dressed and exhibited at farmers' institute meetings, fairs, special meetings and poultry exhibitions throughout the country for many years past.

It has been urged upon our farmers with almost unvarying monotony that not only may they have the desirable chickens of plump and inviting appearance but also excellent winter-laying fowls by their conforming with the following essential conditions, viz. :—

The proper breeds.

Proper management and feeding of the same.

Proper care of the chickens from time of hatching to the saleable age of 3, 3½ or 4 months.

As to suitable breeds it has been shown that no mistake can be made in choosing one of the following varieties, viz.: Barred or White Plymouth Rocks, White Wyandottes or Buff Orpingtons.

Of these varieties and their dual qualifications as egg and flesh producers and the proper caring of their chickens, so as to have the acceptable market type as early as possible, detailed information is given in succeeding pages.

### A DETRIMENTAL PRACTICE.

A practice which seriously retards the quicker and greater production of the superior type of market chickens is that of using a Leghorn, Andalusian or Hamburgh male with pure bred or mixed fowls of larger size, presumably with the object of having better layers. While such a course may be permissible from an egg standpoint, it is not advisable for farmers to adopt, who have the dual requirements of eggs and better quality of chickens in view. The result is sure to be chickens of smaller size and much less value than those of the English or American utility breeds. Speaking to the writer on this subject, some months ago, the manager of an extensive purchasing poultry firm of Toronto said 'that the farmers of the country should be strongly urged to abandon the too prevalent custom of using male birds of the Mediterranean breeds for breeding or crossing purposes. We get,' he said, 'so many small chickens of Leghorn or Andalusian cross that we suffer serious loss. These chickens are sent with others and we do not like to refuse them. They cannot be shipped to the English dealers and we cannot put them on the local markets as good quality, so we are glad take what we can get for them.'

Occasionally a case is met with where birds of a large 'first' or 'mixed' cross are kept, and results in winter eggs and large chickens are said to be satisfactory. Inquiry generally elicits the information that all the good points in these fowls are owing to the use of pure bred males of the large breeds, thus conveying the moral that the nearer to the pure breeds the better the birds. In connection with 'first crosses' it must not be forgotten that unless the cross is made every year, by the introduction of new blood, it is apt to degenerate into the nondescript.

### WHAT HAS LED TO INCREASED PRODUCTION.

Although not in proportion to the demand there has yet been an increase of production in both winter eggs and better quality of poultry. It may be interesting to note some of the incentives which have led to past, and are likely to lead to still greater future production, viz :—

1. A rapidly increasing demand with continued high price.

2. A better appreciation by farmers of poultry as money makers.

3. Results of tried and successful practical methods given in Experimental Farm reports for the past seventeen years.

4. Practical instruction at farmers' institute, agricultural or special meetings from different sources.

5. Greater attention to and the devoting of more space to poultry matters by agricultural papers.

6. Increased railway facilities whereby the higher price markets may be reached.

### HIGH PRICE OF EGGS LAST SUMMER AND AUTUMN.

A remarkable feature of last summer's poultry and egg trade was the high price of new laid eggs throughout the country, but more particularly in city markets. During the months of July and August last, a period heretofore of lowest prices, new laid eggs were worth from 18 to 20 cents per dozen, the value gradually rising until 25 cents were obtained for them in September and 30 cents in October. Speaking of this unusual state of affairs, the Toronto *Telegram*, of 19th October last, says : 'What the householders of our city want to know is why they have to pay 30 cents per dozen for new laid eggs at this season of the year ?' And then follows the statement that one reason may be found in the changed methods of management on the part of many farmers, by which the moulting of their hens in summer is brought about with the view of having them winter layers. And such explanation, so far as it applies, is undoubtedly correct, for as soon as 'bringing on the moult' during the summer is generally practised by farmers, new laid eggs in autumn will surely be in less supply. The moulting period, which occurs once every year, is really one of non-production, and it is only wise to have it at the time of year when values are at their lowest. In the poultry department—Experimental Farms Report—for 1896, page 288, full information is given as to how early moulting for some years previously had been brought about, and farmers are advised to adopt a similar course. In 1901 report the subject is again referred to.

It is quite likely that the shortage of eggs during the autumn months will be followed by an increased winter egg production, and as a probable consequence a slight lowering of prices during that season. Should this take place, the experience of recent years tends to show that any falling off in winter values will be compensated for by increased prices during the moulting period. It is quite possible that a more uniform all-the-year-round price for the new laid article may be the ultimate result.

### A QUESTION AS TO POSSIBLE LOWER PRICES.

The question is now being asked : 'Has experimental research shown any likelihood of lower prices in the near future ?'

In reply to this it may at once be said : 'Not as long as the demand is greater than the supply, as it is at present.'

So far instruction from our poultry department, and which is warranted by experience, has been in the way of showing farmers the best and cheapest ways and means of obtaining eggs and the superior quality of poultry at such seasons of the year as will bring them the highest prices. In this connection, observation has shown that there is greater likelihood of a larger and more immediate supply of new laid eggs in winter than of the superior quality of market poultry in later months. For the reason that so many farmers have more time in winter to care for their laying stock (and which attention is absolutely necessary) than they have in the spring and early summer to devote to the hatching and rearing of chickens. This phase of the subject is fully discussed in poultry department report for last year, 1902.

### WHAT BREEDS EXPERIENCE HAS SHOWN AS BEST FOR FARMERS—PREVIOUS INSTRUCTION CONFIRMED.

Much experience has been gained since the first report of this department was issued seventeen years ago. Better methods of management and the more effective application of different rations have made themselves evident from time to time, and have been noted in previous reports. But it has not been found necessary to recommend any other than certain breeds which, from the first, have proved themselves best suited to the requirements of the farmers, as winter layers, and the progeny of which make quick growing chickens. Rather has experience shown that a more general adoption of such breeds would be followed by still better results. The fowls of Plymouth Rock and Wyandotte breeds have always been advocated as essentially 'utility breeds' for farmers, because experimental handling of them for many years has proved them to be such. To-day these breeds are placed by practical authorities at the head of the list of fowls best adapted to the wants of the farmer. Other breeds have come to the fore in recent years, notably the Orpington family of English origin, with its numerous varieties, and each with strong claims as prolific egg layers and flesh makers of acceptable market type. We have also Rhode Island Reds, from the eastern states of America, with strong claims from utility standpoints. These breeds are now on their trial. If they have the merit claimed for them, they will take rank with the best. If they cannot hold their own in competition with the other standard breeds named no sentimental regard or 'bolstering up' will be found sufficient to keep them from a lower rating. It is a matter of congratulation that it has not been found necessary to make any change in the advice given as to the breeds best adapted to the requirements of the farmer. To have recommended change without reason would have been to confuse rather than benefit.

### STRAIN ALL IMPORTANT.

The importance of *strain* has made itself apparent in no uncertain manner. Letters received from many points of the country show that much of the disease among poultry in recent years may be traced to inbreeding and the resulting lack of constitutional vitality. This has made itself very evident in the case of turkeys, the mortality among which in all parts of the country is much greater than it should be. In summing up the results of an egg laying contest held in England some months ago, the secretary of a leading poultry association of that country remarks 'that the value of strain made itself more evident than ever. It did seem as if strain was as important, if not more so, than breed.' Such being the case, farmers who purchase eggs for hatching, or stock to breed from, should ascertain that both are from strains of noted worth.

### THE EXPERIMENTAL WORK OF THE YEAR.

Experience has shown that in order to have hens lay early and well during winter it is necessary that they should moult during the summer months. The numerous inquiries received from time to time, as to how this is accomplished, shows growing appreciation of the importance of the event. A description of the methods which have been sucessfully adopted in our department for the past and several previous summers will best convey the information as follows: 'The sale of eggs for hatching purposes being over during the first week in July the male birds were removed from the breeding pens to another building containing small compartments with outside runs. The breeding stock as well as all other hens were then allowed to run promiscuously in fields in rear of the poultry buildings where there were grass, clover and shade, three important essentials. At this time the rations were reduced to half quantity. The effect of this was immediately to very much reduce and ultimately to almost entirely stop egg production, which was the desideratum. The half rations were continued for two weeks when full quantity was resumed as follows: Mash composed of coarsely ground oats 2 parts; shorts 1 part; gluten meal 1 part with beef scraps in proportion of one pound to 15 fowls. The mash, which in summer was mixed with cold water was fed three times per week. At times a small quantity of linseed meal was added. The beef scraps were used in lieu of cut green bones because it was not convenient to procure the latter. If mash was fed in the morning wheat, or oats or both mixed were given in the afternoon, or, *vice versa*. On such days as mash was not given grain took its place. An excellent summer grain ration is composed of buckwheat and oats mixed. Pure water should always be in abundant supply. In response to this treatment results have always been satisfactory and by the end of September or beginning of October the hens have looked remarkably well. The advice of Dr. Sanborn, a well-known poultry authority, in reference to the moulting period is valuable enough to warrant its repetition. He says: 'A moulting hen is easily fattened. Hence at this period feed lightly of those foods which produce fat. Corn, cornmeal, middlings, potatoes must be used sparingly. Increase the amount of green bone, bran and skim milk. A run in a field of clover will be a help. Keep all males by themselves during the moulting period. Shelter the hens from storms or cold rains. The ideal place for a run is an apple orchard where, in addition to the grass, may be found insects in the fallen fruit, &c. Birds should go into the moult not fat, free from lice and with no red mites in the house.'

### EARLY FALL WORK—HANDLING THE PULLETS.

No effort was made to stimulate the hens to lay during October. What eggs there were came from early hatched pullets which, with the other chickens hatched during the season, were kept in location some distance from the older stock. Experience has shown the advisability of keeping the pullets away from the hens of older age. For the reason that the quantity of stimulating food that would be positively beneficial to the pullets would make the more mature laying stock—notably of the heavy breeds—too fat. And the object of every experienced breeder is to avoid such disaster as having his prospective layers go into winter quarters in an overfat condition. It is to be borne in mind that it is far easier to prevent than to remedy an overfat condition. In a previous page it is stated that one of the drawbacks to a greater supply of new laid eggs during winter is a lack of knowledge or appreciation of certain essentials necessary to success. Here is one of these details met with at the beginning of the season of highest prices. If the prospective layers through mismanagement, or, carelessness are allowed to become too fat, it is a matter of weeks to get them into proper condition. The dividing line between too much and too little is very fine. He who knows the happy medium makes the profit. Only a thorough knowledge of conditions and close observation of symptoms will show where the line is to be drawn.

### WHEN THE PULLETS BEGAN TO LAY.

The pullets which had been well-fed and cared for from time of hatching, began to lay at age and dates as follows :—

B. P. Rock pullet hatched April 14, laid October 5.

L. Bra-P. R. Cross pullet hatched April 17, laid October 25.

W. P. Rock pullet laid November 19.

Buff Orpington pullet laid November 27.

Faverolle pullet laid November 17.

### COMMENCEMENT OF WINTER LAYING

In the early part of November last the first snow fell and remained. The fowls were, in consequence, placed in different pens according to variety. Experience has shown that where a number of fowls are kept in different compartments, when once placed they should be allowed to so remain. Moving them from one place to another has always been found detrimental to early or steady laying. This is known to experienced breeders, but beginners are sometimes apt to indulge in the practice. Winter laying may be said to have begun on the 18th November and was fairly general by the end of the month, when 30 to 37 eggs were laid per day, the number increasing as the month became older. The first fowls to begin laying after moulting were :—

Barred Plymouth Rock, hens and pullets ; White Plymouth Rock, hens and pullets ; Buff Leghorn, hens and pullets ; Faverolle, hens and pullets ; Buff Orpington, hens and pullets; Buff Plymouth Rock, hens and pullets.

### TESTING FERTILITY AND STRENGTH OF GERM.

During the months of March and April for some years past investigation has been made with the view of discovering, if possible, the cause, or causes, of so many weak germs found in eggs laid at the latter part of winter, and early spring by hens which were confined to limited quarters in the farm poultry houses. The houses were artificially heated to a moderate temperature, varying from 30 in cold weather to 50 degrees on mild days. The fowls had been gently stimulated to lay, but with no condiment, and had laid fairly well. But these eggs when hatched out in late March or April by incubator or hens, produced few chickens. The eggs on being tested showed a fairly satisfactory percentage of fertility, but on examination, after the hatch was over, a great many chickens were found dead in the shell, the majority of them, at the 'pipping' stage.

With the view of obtaining further *data* a number of pens were mated up on the fowls going into winter quarters. Tests heretofore had been made towards the end of the winter season. The object on this occasion was to test the fertility and strength of germs of eggs laid early in December and before the hens had become enervated by long laying or confinement. Accordingly on December 20, 181 eggs of different breeds (enumerated further on) were placed in an incubator. On the 26th instant 18 clear eggs (i.e., without germs) and 6 with partially developed germs, were removed.

On January 1 (eleven days from date of placing eggs in incubator) a further test was made with the following results:—

Barred Plymouth Rocks—46 eggs showed 69 per cent fertility.

L. Bra-B. P. Rock Cross—54 eggs showed 90 per cent fertility.

Rhode Island Reds and White Plymouth Rock—49 eggs showed 61 per cent fertility.

Buff Leghorns—8 eggs showed 26 per cent fertility.

The rapidly developing germs presented a strong and healthy appearance. This was confirmed by later examination. An unfortunate accident to the incubator two days before the chickens were due resulted in the death of all but 26, which, however, hatched out apparently strong and healthy.

Further experimental tests were made with eggs laid from time to time during the balance of the season and confirmed the conclusions of previous years. These conclusions showed that the longer and closer the term of artificial life of the laying stock the greater was the weakness of the germs. In report of 1901, a mistake frequently made, that of speaking of fertility and strength of germ as of one and the same significance, is pointed out. Experience has shown, with no uncertainty, that it is one thing to have a high percentage of fertility and another to have results in a corresponding number of robust chickens. It is the strong and lively chicken which will make rapid growth, that is wanted. It has been shown by experiment that the germs in eggs from hens closely confined to winter quarters, but laid in spring time, although showing a high percentage of fertility, did not result in many chickens. The germs had died in different stages of development, the greatest number when fully developed, or at the 'pipping stage.' And in many cases the chickens which came out proved weaklings. As warranting the foregoing conclusions, the following results of experimental tests are given:—

On March 27 last (1903), 202 eggs of different breeds (described further on) were placed in one of the most reliable incubators on the market. The result was 39 chicks. The eggs placed in the incubator were laid probably during the third week of the month named, and by hens which were kept in artificially, but moderately heated compartments of our poultry houses. The fowls had received generous rations with a view to egg production, and had laid fairly well for the most part of the previous winter. The following table shows a fairly satisfactory percentage of fertility, but an unsatisfactory number of chickens hatched:—

RESULTS from Early Spring Eggs laid by hens kept in warm houses during winter. Put into an Incubator on 27th March, 1903.

| Discription of Eggs. | No. of Eggs put in Incubator. | Eggs Tested Out. | No. of Chickens Hatched. | Eggs which did not Hatch. | Examination of Eggs which did not Hatch and Results. |
|---|---|---|---|---|---|
| Rhode Island Reds...... | 31 | 10 | 7 | 14 | Of these one was found clear; remainder contained fully developed chicks dead in shell. |
| Barred P. Rocks........ | 29 | 5 | 2 | 22 | 1 egg apparently without germ; 21 eggs with fully developed chickens dead in shell. |
| White P. Rocks.... .... | 38 | 15 | 11 | 12 | 1 egg without germ; 11 chicks dead in shell at pipping stage. |
| Silver Gray Dorkings ... | 34 | 12 | 7 | 15 | Eggs with germs dead at various stages of incubation. |
| White Wyandottes...... | 20 | 6 | 8 | 6 | 1 egg without germ; remaining eggs contained well developed chickens dead in shell. |
| Buff Orpingtons......... | 26 | 9 | 1 | 16 | 2 eggs found without germs; remaining eggs with germs dead in more or less advanced stages of incubation. |
| L. Bra.-B. P. Rock cross. | 24 | 5 | 3 | 16 | Unhatched eggs in different stages of incubation. |
| Total.......... .. | 202 | 62 | 39 | 101 | |

The above table shows a large number of unhatched eggs, which, upon examination, were found, in the great majority of cases, to contain chickens fully developed but dead, presumably too weak to break their way out of the shell. a very discouraging result certainly. Under similar circumstances, the first conclusion would be, on the part of the inexperienced, to blame the incubator. But if it hatched 39 chickens, was it not as capable of hatching out more, if germs were as strong in the unhatched eggs as in those which produced chickens ?

### SIMILAR EGGS UNDER HENS AND RESULTS.

In order to ascertain results with hens as hatching mediums, on the same day as the incubator was started, three Faverolle hens, which were broody, were given 13 eggs each. The eggs were of the same kind and age as those put into the incubator, as follows:—

| Description of Eggs | No. of Eggs Set. | No. of Chicks Hatched. | Remarks. |
|---|---|---|---|
| Barred P. Rock.......... | 13 | 1 | Eggs were hens' and pullets'. On testing all eggs showed fertility. Examination of eggs which did not hatch showed 8 with fully developed chicks dead in shell at 'pipping' stage; 3 eggs with premature germs; 1 egg was missing. |
| White Wyandotte.... ... | 13 | 6 | Hens' eggs; 2 clear eggs were tested out; 1 fully developed chick was dead in shell; 2 eggs were missing, probably broken in nest; 2 chicks were crushed by hen in nest. |
| Rhode Island Reds. .... | 13 | 8 | Hens' eggs. On testing one egg was found to contain dead germ; 1 egg was accidentally broken. Examination of eggs which did not hatch showed 2 fully developed chicks dead in shell; 1 egg with partially developed germ. |
| Barred P. Rock.......... | 13 | 2 | This hen was set on April 4th, a week later than the preceding ones. On testing 3 clear eggs were found. Remaining 10 eggs all showed fertility. Examination of unhatched eggs showed that two fully developed chicks had been crushed in nest by hen. Remaining 6 eggs contained dead germs. |
| Total ... .......... | 52 | 17 | |

As compared with results from the incubator this showing is in favour of the hens, but the average experience of several years past does not point to much difference between incubator or hen when conditions are equally favourable to both.

### RESULTS FROM EGGS LAID BY HENS IN COLD HOUSES.

The above results, it will be borne in mind, are from eggs laid by hens which had been kept in warm houses and given rations calculated to gently stimulate egg production during winter. It will be interesting, then, to compare these results with those from hens which had not—nor had their parent stock—known what warm winter quarters were. Fowls which were kept under such conditions as are to be met with in the majority of farm-yards throughout the country. Certain conclusions are noted in report of last year. Investigation was continued last winter and spring, as follows:—

On the 11th of last March 13 eggs laid by Buff Orpington pullets from hardy stock—as described above—were set under a B. P. Rock hen. On 2nd of April 10 chickens hatched. On eggs being tested, one clear egg was found. Examination of the two eggs which did not hatch showed two embryos, which had probably died about fourteenth day after eggs were put under hen.

On March 21 (ten days later), 13 eggs, also laid by Buff Orpington pullets, were placed under another B. P. Rock hen. On 11th April, 11 chickens hatched, one chick was crushed in nest by the hen. Examination of the remaining egg showed a fully developed chick dead about 'pipping' time.

On March 21 (same day), 13 eggs of Buff Orpington pullets were given to a Langshan hen. Result, 11 chicks.

The most convincing results were obtained from 16 eggs (half Buff Orpington and half B. P. Rock pullets), which on March 9 were placed under a large hen, and in due course every egg hatched. And what was further satisfactory, every one of the 16 chickens lived and made rapid growth.

The total of 48 chickens from 55 eggs laid by pullets, which had been kept in cold winter quarters—as had their parent stock—and which had been good winter layers, is in favourable contrast with 17 chickens from 52 eggs laid by fowls which had been kept in artificially warmed poultry houses.

It is also an effectual answer to the statement, sometimes made, that strong germs cannot be had in early spring time from hens which have laid steadily during the winter.

To farmers, particularly those in parts of the Dominion where the winters are rigorous, these results are important, as they are strikingly in favour of fresh air and plenty of it, even if it is cold.

They are doubly important, as giving proof that with intelligent effort it is possible and profitable to build up strains of fowls to suit winter conditions, rather than to attempt making winter conditions suit the fowls.

### SUMMARY OF EXPERIENCES GAINED RE FERTILITY AND STRENGTH OF GERM OF EGGS LAID IN WINTER.

A summary of the experiences gained in connection with the testing and hatching results of eggs laid during the cold season under conditions described, in detail, in foregoing pages may be given as follows:—

1. The generous and gently stimulating rations given to the fowls kept in cold houses did not seem to affect the strength of the germs of the eggs laid by them, as similar rations apparently did in the case of the hens kept in artificially warmed quarters.

2. Eggs laid in early December by the hens in artificially warmed houses showed a greater percentage of strong germs than did eggs laid by them later in the season.

3. Eggs laid by the same hens in early spring showed a satisfactory percentage of fertility, but the weakest germs.

4. The most striking and gratifying results were obtained from the fowls which, like their parent stock had never known warm quarters. From 55 eggs laid by these fowls in early spring—after laying well during the winter—48 strong chickens were hatched. In contrast with this are 17 chickens from 52 eggs laid by hens kept in warmed, but comparatively limited quarters.

5. Results were strongly in favour of the average farm conditions, such as were described by Mr. Wm. Moe, of South Franklin, Que., on page 318 of 1901 report. Mr. Moe has an open shed attached to his poultry house, and to this shed, which is protected by a curtain in stormy weather, his fowls have access, so obtaining fresh air and exercise. The latter is secured by throwing grain in litter which is always on the floor of the shed.

### HOW THE HENS WERE SET.

Although incubators are becoming more general in use, there are yet a number of persons who use hens as hatching mediums. To them the following method as adopted in the poultry department of the experimental farm will be found useful. During the early part of the season several hens became broody, presumably those which had laid well during winter, and they were given eggs. Wooden boxes, without bottoms, and with a hinged door in front, were used to place the sitters in.

These boxes should be roomy and need not be expensive. At the bottom of the box a comfortable nest was made, preferably of oat straw, which was well dusted with insect destroying powder. Three or four imitation eggs were placed in the nest and the sitter, which was also well dusted with powder, was placed on the eggs. She was allowed to remain on these eggs for 24 or 36 hours. The object in so doing was to destroy any vermin that might have been on hen, or in the nest. A lice-infested fowl will not make a good sitter. Should she succeed in bringing out a number of chickens they will likely be seized upon by the lice and will soon dwindle away. Scores of chickens are lost every season in this way, and the cause attributed to any but the right one. Two or three times during the incubating period the sitter should be dusted under the wings, in the fluff and back of the neck with lice-destroying powder. In the case of borrowed sitters some such measures are absolutely necessary. Food, in the shape of mixed grains, water and grit were supplied regularly every day. In the morning the doors of the nest boxes, which had been closed from the previous day were opened, and the sitters allowed opportunity to get to food and drink. Where there are valuable eggs they should be examined every morning when the sitter is off the nest. If any have been broken the remaining eggs should be carefully washed in lukewarm water and returned to the nest, which should also be thoroughly cleansed. In early spring, when the weather is yet cool, the sitter should not be away from the nest longer than eight or ten minutes.

### INCUBATORS.

With all incubators are sent full instructions as to their proper management and care. Instructions as to care and feeding of the chickens accompany all brooders, which are generally purchased with the incubator and from the same maker. As is generally known, the chickens, 36 hours after being hatched in the incubator, are removed to the brooder where they will remain until fully feathered, when they will be removed to other quarters. The brooder is really the foster-mother, as it is called in England. The chickens are hatched in the incubator and reared in the brooder.

### EGGS SET AND CHICKENS HATCHED.

The following table shows the number of eggs set and chickens hatched. It also gives description of the eggs which did not hatch—as learned by examination after the other eggs had hatched out chickens.

## EGGS SET AND CHICKENS HATCHED. DESCRIPTION OF EGGS WHICH DID NOT HATCH.

| When Eggs were Set. | Description of Eggs. | Hens or Pullets Eggs. | When chicks were Hatched. | Number of Chickens. | Description of Sitter. | Results of Examination of Eggs during and after Hatching. |
|---|---|---|---|---|---|---|
| 1903. | | | | | | |
| March 5... | 13 Buff Orpington eggs..... ...... | Pullets..... | March 26. | 5 | Buff Orpington ..... | Eggs from Winchester, Ont. Tested out 4 clear eggs. 1 with germ just started. 3 contained half developed germs. |
| " 11... | 13 " " ............. | " .... | April 2. | 10 | B. P. Rock hen. ... | Eggs were from hens kept in cold houses with run in shed. Only 3 eggs did not hatch. 1 of these was clear. 2 others contained embryos dead at 14th day. |
| " 21... | 13 " " ............. | " ..... | " 11. | 11 | " " ..... | Eggs from hens kept in cold house but with run in shed. 1 chick crushed in nest. 1 egg contained fully developed chick but dead. |
| " 21... | 13 " " ..... ....... | " ..... | " 11. | 11 | Langshan hen....... | Eggs from hens kept as two previous ones. 1 egg broken by hen. 1 chick crushed in shell. |
| " 24... | 13 " " ............. | Hens....... | " 14. | 5 | Buff P. Rock hen.... | These hens were probably a little fat. They were kept in a cold house, but did not lay as well as pullets. 2 eggs were clear. 2 were addled. 1 contained fully developed dead chick. 3 with partially developed germs. |
| " 24... | 13 B. Plymouth Rock eggs.......... | Pullets...... | " 14. | 8 | " " ... | From fowls kept in cold house as previous ones. Examination showed 3 clear eggs. 1 chick crushed in shell. 1 egg missing. |
| " 27... | 13 " " ....... .. | Both....... | " 17. | 1 | Faverolle hen....... | Eggs were from hens kept in an artificially heated house. On examination 8 eggs were found to contain 8 fully developed chicks dead in the shell about pipping. 1 egg was missing. 3 contained immature germs. |
| " 27... | 13 " " ......... | Hens .... | " 17. | 6 | " " ..... | Hens kept in warm house. On testing 2 eggs were found clear. 2 chicks crushed in nest. 1 dead in shell. 2 eggs missing. |
| " 27... | 13 Rhode Island Red eggs.... ...... | " ..... | " 17. | 8 | " " .... | In testing 1 egg accidentally broken. 1 with dead germ. After hatching 2 fully developed chicks dead in shell. 1 partially developed. |
| April 4... | 13 B. Plymouth Rock eggs.......... | " ..... | " 25. | 2 | Orpington hen...... | On testing 3 eggs were found clear. All remaining eggs contained apparently strong germs yet results were poor, showing weak germs. 2 chicks were killed by hen. Remaining eggs contained dead germs. |
| " 9... | 13 Jubilee Orpington eggs.... ...... | Pullets..... | " 30. | 3 | " " .... | Eggs were imported from New Jersey. Were shaken up in transit. 1 egg broken. 1 chick dead in shell. 4 eggs addled. 4 chicks crushed in shell by hen. |
| " 9... | 13 " " .......... | " ..... | " 30. | 5 | R. I. Red hen...... | 2 eggs were broken. 5 eggs were addled. 1 chick dead in shell. Eggs came by express from New Jersey. |
| " 11... | 13 " " .......... | " ..... | May 1. | 5 | Buff P. Rock hen.... | On examination 3 eggs were found addled. 5 eggs were missing. |
| " 12.. | 13 Brown Leg—B. P. R. cross eggs .. | " ..... | " 2. | 12 | S. G. Dorking hen.. | Only 1 egg did not hatch. Hens having had run outside for some time germs had become strong. |

| | | | | | | |
|---|---|---|---|---|---|---|
| " 16... | 13 B. P. Rock eggs.............. | " ..... | " 7. | 7 | White P. Rock pullet | Eggs came from Moosomin, N.W.T., and were probably much shaken up. 1 egg was clear. 1 addled. 1 missing. 3 with partially developed germs. |
| " 16... | 13 " ............ | " ..... | " 7. | 3 | Buff Rock hen...... | Eggs from Moosomin, N.W.T. Probably shaken up *en route.* 5 clear eggs. 3 with dead chicks. 1 addled. 1 egg missing. |
| " 16... | 13 Buff Orpington eggs.............. | Hens...... | " 7. | 3 | S. G. Dorking pullet | Old male bird mated with hens. Result 10 clear eggs. |
| " 20... | 13 Black Minorca eggs.............. | " ..... | " 11. | 9 | Faverolle hen....... | 1 egg with fully developed chick dead in shell. 2 chicks crushed in shell by sitter. 1 egg addled. |
| " 30... | 13 Brown Leg—B. P. R. cross eggs .. | Pullets..... | " 21. | 9 | WhiteWyandottehen | 2 chicks killed. |
| May 7... | 11 White Leghorn eggs.............. | " ..... | " 28. | 5 | B. P. Rock hen. .... | On testing eggs, which came from Myrtle, Ont., 5 were found to be clear. 3 eggs were broken, thin shells. |
| " 7... | 13 Silver G. Dorking eggs. .......... | " ..... | " 28. | 6 | S. G. Dorking hen .. | On examination 7 eggs were found with germs in different stages of development. |
| " 7... | 5 B.P.R.-5 W.Wy.-3 Buff P.R. eggs | " ..... | " 28. | 13 | W. P. Rock hen .... | All eggs hatched. |
| " 11... | 13 Buff Orpington eggs.......... | " ..... | June 1. | 9 | " " .... | Eggs from Winchester, Ont. 1 egg was found clear. 2 with germs partially developed. 1 egg broken. |
| " 12... | 8 Buff Orp.—5 B. P. Rock eggs.... | Hens.... .. | " 2. | 8 | B. P. Rock hen..... | On testing all eggs seemed fertile. On examination after hatching 2 eggs were found which did not hatch. 1 chick was crushed in the nest. 2 eggs were missing. |
| " 23... | 13 Buff Orpington eggs............. | Pullets..... | " 13. | 11 | W. P. Rock hen .... | On examination after hatching 2 eggs were found addled. These eggs were obtained from Mr. J. S. Allen of Ottawa. |
| June 5... | 15 Assorted eggs.................... | Both....... | " 26. | 5 | B. P. Rock hen.... | Bad sitter. 3 chicks killed by hen. 2 eggs were broken. 5 eggs contained partially developed germs. |
| " 15... | 15 Faverolle eggs....... ..... .. | Hens. ..... | July 6. | 9 | " " ..... | 2 eggs were addled. 2 chicks died in nest. 2 chicks were crushed in nest. |
| " 16... | 13 White Leghorn eggs.. .......... | " ....... | " 7. | 9 | " " ..... | 2 chicks dead in shell. 2 eggs were broken. These eggs came from Myrtle, Ont. |
| " 16... | 13 " " ............ | " ....... | " 7. | 8 | " " ..... | 2 eggs were broken by hen. 2 chicks died in shell. 1 egg did not hatch. Eggs came from Myrtle, Ont. |
| " 16... | 13 Jubilee Orpington eggs.. ...... | " ....... | " 7. | 9 | .... ......... .... | Eggs came from W. P. Willett, East Orange, N.J. 4 eggs did not hatch. |
| Eggs set .. | 392 Chickens hatched......... ... | ........... | .. ...... | 215 | | |
| | Incubator Hatched Chickens. | ............ | .. .... . | 157 | | |
| | | | | 372 | | |

From above table it will be seen that the germs of the eggs laid by hens which were confined to limited quarters in artificially warmed houses, during the winter season, did not become strong enough to give a satisfactory percentage of robust chickens until they had run outside and recuperated from their term of indoor winter life. As was the case last year, this seemed to be about the middle of April.

### PROGRESS OF THE CHICKENS.

On the chickens being hatched out, if by incubator, they were placed in brooders outside. If by hens they were put with their mother hens, in coops with slatted fronts on the grass in front of the poultry buildings.

The coops were so arranged that they could be securely fastened at night, while ventilation was provided for. The little doors which closed the front of the coops at night made convenient and clean platforms whereon to feed the chicks during the day. Through the slats the chicks could run on the grass, while the hen remained inside. Sand or dry earth to the depth of two or three inches was placed on the floor of the coop. On taking the mother hen from the nest, she was given food and water. She had probably been on the nest, bringing out her chickens, for 36 hours, and required both. Any little attention at this time to the sitter is well bestowed, for it is well known to poultry-raisers that a well-fed mother is likely to brood her chickens satisfactorily. It is most important that the chickens should be well brooded, as well as carefully fed and looked after during the early period of their lifetime. The same rations as used in previous years for brooder and hen-raised chickens were given last season, viz.:—

First few hours very little food is required. If the hen has been well fed, as suggested, she will be inclined to brood her chicks. This is desirable, particularly in the early part of the season. A few stale bread crumbs will be all the food required.

Next day.—Give stale bread soaked in milk and squeezed dry. Feed a little at a time and leave none on the platform. A little hard boiled egg finely cut up may be added with benefit.

Continue this for a day or two and add granulated oatmeal or finely crushed wheat. Many persons feed finely crushed wheat from the first, and with success.

At the end of ten days crushed corn was given. Whole wheat was not fed till after twelfth day and then a little at a time.

As the chicks grew older, they were fed a mash composed of stale bread, shorts, cornmeal, ground meat, &c. A small quantity of finely cut bone was eaten with avidity and with benefit. Skim or sweet milk and water were given for drink.

On the chickens becoming fully feathered, the mother hens were placed with the others and the chicks returned to their coops as usual, and were allowed to remain in them until removed to more commodious quarters in the shape of a colony house, or one of the small pens in No. 2 house.

### WEIGHT DEVELOPMENT OF CHICKENS.

Fed and treated as above, the chickens of the different varieties made the following weight development:—

| | Lbs. | Oz. |
|---|---|---|
| Barred P. Rock Cockerel at 2 months, 3 days of age...... | 1 | 12 |
| " " " " ...... | 1 | 7 |
| " " 3 months and 6 days of age .. | 3 | 0½ |
| " " " " .. | 2 | 15½ |
| White P. Rock Cockerel at 2 months, 3 days of age...... | 1 | 12 |
| " " " " ...... | 1 | 9 |
| White Wyandotte " " " ...... | 1 | 8½ |
| " " " " ...... | 1 | 7 |

| | Lbs. | Oz |
|---|---|---|
| Rhode Island Red Cockerel at 2 months, 3 days of age . . . . | 1 | 10 |
| " " " " . . . . . . | 1 | 12 |
| Buff Orpington " " " . . . . . . | 1 | 12 |
| " " " " . . . . . . | 1 | 9 |
| " " 4 months of age. . . . . . . . . . | 3 | 15½ |
| " " " " . . . . . . . . . . | 4 | 8 |

### CROSSES.

| | | |
|---|---|---|
| Light Bra.-B.P.R. (2nd cross) Cockerel at 2 mos. 3 days of age. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 1 | 13 |
| Light Bra.-B.P.R. (2nd cross) Cockerel at 4½ mos. of age. . | 4 | 14 |
| " " " " . . | 4 | 6 |
| Bro. Leg.-B.P.R. Cross Cockerel at 2 mos. 3 days of age. . | 1 | 10½ |
| " " " " . . | 1 | 5 |
| " " " 3 mos. of age . . . . . . | 2 | 15 |
| " " " " . . . . . . | 2 | 6 |
| " " " 4 mos. of age. . . . . | 4 | 7 |
| " " " " . . . . . . | 4 | 4½ |

### JUBILEE ORPINGTONS.

The Jubilee Orpingtons are a new variety of the Orpington family, and were originated by Messrs. Cook & Son, the well known poultry breeders of Kent, England, who are also the originators of the Buff Orpingtons. It is claimed for the Jubilee Orpingtons that the cockerels made rapid flesh development and are acceptable market types at 3 and 4 months of age. It is claimed for the pullets that they are early and good winter layers.

From settings of eggs obtained from Mr. W. P. Willett, of East Orange, N.J., U.S.A., the agent of Messrs. Cook, several chickens were hatched. The weight development of some of the cockerels were as follows:—

| | Lbs. | Oz. |
|---|---|---|
| Jubilee Orpington Cockerel at 2½ months...... .... .... | 2 | 2½ |
| " " .. .. .. .. .. .... | 1 | 14 |
| " " .... .. .. .. .. | 1 | 14 |
| Jubilee Orpington Cockerel at 3 months.... .............. | 2 | 15 |
| " " .. .. .. .. ... .. | 2 | 6 |
| " " .. ...... .. .. | 2 | 4½ |
| Jubilee Orpington Cockerel at 4 months.... ...... ...... | 3 | 15 |
| " " .... .... .. .. | 3 | 4 |

Another variety of the Orpington breed, named Spangled Orpingtons, has recently been originated, and is exploited as a remarkably promising type of early market chicken.

In the foregoing account of the weight development of chickens of the different varieties named, it may be said that they were in no way forced beyond being regularly fed on rations as described, were well cared for and their coops cleaned every day. When about three months of age several of their number were handed over to the chemical division for fattening experiments on different rations. A detailed account of these experiments by Mr. F. T. Shutt, chemist, will be found in a subsequent page.

### EGGS LAID FROM DECEMBER TO JUNE 30.

The following table will show the number of eggs laid by different breeds and their varieties during the months of highest prices. In some cases hens were kept over for breeding or hatching purposes. In others some of the pullets were late, but commenced to lay in the spring when other hens were becoming broody. Experience has, however, shown that it is best for the farmer to keep over the winter the pullets that are likely to make early and continuous layers during that season.

EGGS laid by different breeds from December 1, 1902 to June 30, 1903.

| BREEDS. | 1902. | 1903. | | | | | | Totals. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|
| | December. | January. | February. | March. | April. | May. | June. | | |
| 8 White Leghorn hens... | 84 | 71 | 63 | 113 | 126 | 111 | 68 | 636 | |
| 10 Black Minorca " ... | 64 | 77 | 65 | 128 | 167 | 169 | 62 | 732 | |
| 7 Brown Leghorn " ... | 42 | 31 | 42 | 107 | 116 | 99 | 40 | 477 | |
| 12 Langshan " ... | 158 | 135 | 103 | 141 | 120 | 128 | 105 | 890 | As the hens of the sitting varieties became broody they were given eggs, as shown in table of eggs set and chickens hatched. |
| 30 Barred P. Rock " ... | 225 | 202 | 142 | 260 | 285 | 234 | 165 | 1,513 | |
| 18 " pullets | 85 | 153 | 126 | 222 | 201 | 182 | 65 | 1,034 | |
| 15 White P. Rock hens... | 120 | 98 | 75 | 141 | 141 | 124 | 111 | 810 | |
| 14 " pullets | 82 | 146 | 146 | 164 | 182 | 157 | 75 | 952 | |
| 4 Buff P. Rock hens..... | 59 | 94 | 64 | 71 | 32 | 32 | 31 | 383 | |
| 12 White Wyandotte hens | 113 | 112 | 86 | 133 | 126 | 81 | 69 | 720 | |
| 4 " pullets | 45 | 75 | 55 | 81 | 35 | Brdy. | ...... | 291 | |
| 15 Buff Leghorn hens.... | 71 | 38 | 28 | 106 | 116 | 95 | 55 | 509 | |
| 3 Buff Orpington hens... | 45 | 50 | 34 | 33 | 50 | Brdy. | ..... | 212 | |
| 13 " pullets. | 35 | 94 | 103 | 107 | 133 | 174 | 118 | 764 | |
| 12 Rhode I. Red hens .... | 126 | 158 | 129 | 180 | 131 | 134 | 95 | 953 | |
| 6 Faverolle hens ....... | 67 | 97 | 93 | 73 | 63 | 29 | 39 | 461 | |
| 9 Mixed hens. ..... .... | 57 | 47 | 47 | 127 | 169 | 116 | 44 | 607 | |
| 7 White Ind. Game hens. | ... | 29 | 9 | 17 | 77 | 47 | 31 | 210 | |
| 8 White Leghorn pullets. | .... | 55 | 70 | 132 | 126 | 93 | 44 | 520 | |
| 11 Silver G. Dorking hens. | 50 | 132 | 115 | 115 | 94 | 75 | 42 | 623 | |
| 15 L.B. B.P.R. cross pullets | 174 | 113 | 88 | 191 | 189 | 168 | 69 | 992 | |
| | 1,702 | 2,007 | 1,683 | 2,642 | 2,679 | 2,248 | 1,328 | 14,289 | |

EGGS LAID DURING THE YEAR.

The number of eggs laid during the different months of the year are as follows:—

| | |
|---|---|
| 1902. | |
| December | 1,702 |
| 1903. | |
| January | 2,007 |
| February | 1,683 |
| March | 2,642 |
| April | 2,679 |
| May | 2,248 |
| June | 1,328 |
| July | 857 |
| August | 482 |
| September | 386 |
| October | 106 |
| November | 346 |
| | 16,466 |

### LIST OF STOCK IN POULTRY BUILDINGS.

During the month of November, a number of the old and young birds were disposed of and others of different varieties were purchased instead.

The list of stock on hand at the end of the year and their disposition is as follows:—

| Pen. | ——— | Females | Males. |
|---|---|---|---|
| 1.. | Barred Plymouth Rock hens | 10 | 1 |
| 2.. | "  "  " | 10 | 1 |
| 3.. | White Plymouth Rock hens | 10 | 1 |
| 4.. | Buff Orpington Rock hens | 6 | 1 |
| 5.. | White Wyandotte hens | 10 | 1 |
| 6.. | Silver Grey Dorking hens | 10 | 1 |
| 7.. | Black Minorca hens | 9 | 1 |
| 8.. | White Leghorn hens | 10 | 1 |
| 9.. | Buff Leghorn hens | 10 | 1 |
| 10.. | Buff Plymouth Rock hens | 4 | 1 |
| 11.. | Spare Cockerels | .. | 5 |
| 12.. | " | .. | 5 |
| 13.. | " | .. | 5 |
| 14.. | " | .. | 5 |
| 15.. | Brown Leghorn hens (Wyandotte male for crossing) | 4 | 1 |
| 16.. | Silver Spangled Hamburgh pullets | 4 | 1 |
| 17.. | Black Hamburgh hens | 4 | 1 |
| 18.. | Faverolle hens | 5 | 1 |
| 19.. | Light Brahma hens | 4 | 1 |
| 20.. | Silver Laced Wyandotte pullets | 4 | 1 |
| 21.. | White Leghorn (Hodson) pullets | 5 | 1 |
| 22.. | Rhode Island Red hens | 7 | 1 |
| 23.. | Barred P. Rock pullets | 7 | |
| 24.. | Silver Grey Dorking pullets | 7 | 1 |
| 25.. | Rhode Island Red pullets | 7 | 1 |
| 26.. | White Wyandotte pullets | 7 | 1 |
| 27.. | Jubilee Orpington pullets | 7 | 1 |
| 28.. | Buff "  " | 9 | 1 |
| 29.. | Mixed hens | 9 | |
| 30.. | " pullets | 9 | |
| 31.. | Brown Leg—B. P. Rock cross pullets | 9 | |
| 32.. | Mixed pullets | 9 | |
| 33.. | Mixed (late hatched) pullets | 8 | |

## EXPERIMENTS IN CHICKEN FATTENING.

By Frank T. Shutt, M.A., F.I.C.,

*Chemist, Dominion Experimental Farms.*

In connection with a series of feeding experiments, made with a view of ascertaining the relative digestibility of certain foods by poultry, we were able during the season of 1902 to obtain data of economic value to those preparing chickens for the market. These results were set forth in the report for that year. In continuing the above mentioned research during the past season, we again accumulated results of practical interest to the chicken fattener. These may now be presented, as follows:—

### PEN *vs.* CRATE.

Experiments to ascertain the relative merits of pen and crate fattening were made in 1902, and the results, together with the description of the crates and pens, with yards attached, will be found on pages 226-7 of the report of the farms for that year. The tests were made with Barred Plymouth Rock and Silver-grey Dorking, and both breeds, from the standpoint of economy in feeding gave marked results in favour of pen fattening.

The interest evinced in the results and the criticisms they received led us this season to further investigate this subject, and we can accordingly present additional data towards the solution of this problem that will be of interest to poultry fatteners. In one particular a change was made from the plan adopted in 1902; the crated birds were fed in the basement of the laboratory building, a room sufficiently lighted and ventilated, but in temperature 10°F. to 15°F. lower than the accommodation used in 1902. When we remember that the results of last season showed that the weekly gains were invariably reduced during spells of abnormally high summer temperatures, the significance of this modification will be apparent.

No. 1 (pen) and No. 2 (crate).—The feeding was commenced on August 13, 1903, the birds being between seven and eight weeks old, and the test continued for four weeks. Each lot consisted of six birds, as follows:—2 Orpingtons, 2 Barred Plymouth Rocks and 2 crosses, Brown Leghorn and Barred Plymouth Rocks.

*The Ration.*—For the first two weeks the following was used :

| | | |
|---|---|---|
| (a) Ground oats | 3 parts. | Protein ratio—1:3·2<br>Cost, 1·54 cents per lb. |
| Ground barley | 1 part. | |
| Meat meal | 1 part. | |

Mixed with a sufficiency of skim-milk.

During the last two weeks the ration was :

| | | |
|---|---|---|
| (b) Ground oats | 4 parts | Protein ratio—1:4.<br>Cost, 1·45 cents per lb. |
| Ground barley | 3 parts | |
| Meat meal | 1 part. | |

Mixed with a sufficiency of skim-milk.

TABLE I.—PEN *versus* CRATE.

| Pen or Crate. | Number of Chicken. | Breed. | Pullet or Cockerel. | Weight. | | | | | | | | | | Gain during Experiment. | | Average gain per Chicken per Week. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Beginning of Experiment. | | 1st Week. | | 2nd Week. | | 3rd Week. | | 4th Week. | | | | |
| | | | | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Oz. |
| No. 1. | | | | | | | | | | | | | | | | |
| Pen.......... ... | 36 | Orpington ...... | P | 3 | 9 | 3 | 14 | 4 | 3½ | 4 | 6 | 4 | 9 | 1 | 0 | 4·0 |
| " .......... | 79 | " ...... | C | 3 | 15½ | 4 | 10 | 5 | 5 | 5 | 12 | 6 | 4 | 2 | 4½ | 9·3 |
| " .......... | 62 | B. L. & P. R.... | C | 2 | 14½ | 3 | 7 | 3 | 9 | 3 | 15 | 4 | 5 | 1 | 6½ | 5·6 |
| " . ... ... .... | 6 | " ... | C | 3 | 11½ | 4 | 5½ | 5 | 0½ | 5 | 2 | 5 | 7 | 1 | 11½ | 6·7 |
| " .... ..... | 72 | Ply. Rock...... | C | 2 | 15½ | 3 | 4 | 3 | 9 | 3 | 14 | 4 | 4½ | 1 | 5 | 5·0 |
| " .......... | 34 | " ...... | C | 2 | 7½ | 3 | 1½ | 3 | 9 | 3 | 13½ | 4 | 4 | 1 | 12½ | 7·1 |
| No. 2. | | | | | | | | | | | | | | | | |
| Crate.......... | 37 | Orpington ...... | C | 3 | 4½ | 4 | 0 | 4 | 11½ | 5 | 3 | 5 | 9½ | 2 | 5 | 9·2 |
| " ......... | 70 | " ...... | C | 4 | 8 | 5 | 4½ | 5 | 11½ | 6 | 4 | 6 | 1½ | 1 | 9½ | |
| " ......... | 76 | B. L. & P. R.... | C | 3 | 9½ | 3 | 13½ | 4 | 4½ | 4 | 7 | 5 | 0 | 1 | 6½ | 5·6 |
| " ......... | 65 | " ... | C | 3 | 8 | 4 | 4 | 4 | 13½ | 5 | 7 | 5 | 12 | 2 | 4 | 9·0 |
| " ......... | 71 | Ply. Rock... .. | C | 3 | 0½ | 3 | 3½ | 3 | 8½ | 3 | 12 | 4 | 2 | 1 | 1½ | 4·3 |
| " ......... | 75 | " .... | C | 2 | 11½ | 2 | 13½ | 3 | 2½ | 3 | 5 | 3 | 11 | 0 | 15½ | 3·8 |
| No. 3. | | | | | | | | | | | | | | | | |
| Pen...... .... | 52 | Ply. Rock...... | C | 3 | 8½ | ........ | | 5 | 0 | ........ | | 6 | 0½ | 2 | 8 | 10·0 |
| " .... .... | 49 | " ...... | C | 3 | 11 | ........ | | 5 | 6½ | ........ | | 6 | 6 | 2 | 11 | 10·7 |
| " .......... | 41 | " ..... | C | 2 | 9½ | ........ | | 4 | 1 | ........ | | 4 | 11 | 2 | 1½ | 8·4 |
| " ..... .... | 50 | " ..... | C | 3 | 4 | ........ | | 4 | 6 | ........ | | 5 | 0 | 1 | 12 | 7·0 |
| " .... .... | 35 | " ..... | C | 3 | 13½ | ....... | | 5 | 7 | ........ | | 6 | 6 | 2 | 8½ | 10·1 |
| " ... ...... | 89 | " ...... | C | 3 | 10½ | ........ | | 5 | 2 | ........ | | 5 | 13 | 2 | 2½ | 8·6 |
| No. 4. | | | | | | | | | | | | | | | | |
| Crate.......... | 33 | Ply. Rock...... | C | 3 | 13 | ........ | | 5 | 7 | ........ | | 6 | 0 | 2 | 3 | 8·7 |
| " ......... | 47 | " ...... | C | 3 | 15 | ........ | | 5 | 9 | ........ | | 6 | 5½ | 2 | 6½ | 9·6 |
| " ......... | 43 | " ...... | C | 3 | 4½ | ........ | | 4 | 7½ | ........ | | 5 | 3½ | 1 | 15 | 7·7 |
| " ......... | 46 | " .... . | C | 3 | 5½ | .. ..... | | 4 | 14½ | ........ | | 5 | 8½ | 2 | 3 | 8·7 |
| " ......... | 66 | " ..... | C | 3 | 7 | ........ | | 4 | 11½ | ........ | | 5 | 7 | 2 | 0 | 8·0 |
| " ......... | 38 | " ...... | C | 3 | 4 | ........ | | 4 | 8 | ........ | | 5 | 6½ | 2 | 2½ | 8·6 |

From the details given in Table I. it will be seen that the increase in weight varied greatly among the members of each group, though the total increase in weight (see Table II.) made during the fattening period was practically the same for each set. Since the birds in the pen ate more food by 2 lbs. 5 ozs., it follows that the cost per pound of increase exceeded that of the crated birds. A further fact in favour of the crate-fed chickens was that they furnished a somewhat larger percentage (2·3 per cent) of dressed carcase (Table III.)

No. 3 (pen) and No. 4 (crate).—Though not in all particulars exactly a duplicate of the foregoing test, its general conduct and the object with which it was made were the same. The chickens employed were all Barred Plymouth Rocks, of one strain and age and very uniform as to weight and build. It was very largely due to this uniformity and the general excellence of type for feeding, we believe, that led to the more satisfactory results than were obtained in the first experiment. The gains throughout were larger, more uniform and were made more economically. Type or build is a matter that has been emphasized repeatedly by the poultry manager as one of considerable importance in the fattening of chickens for the market, and the results of this test, including the general appearance of the dressed birds, certainly support his contention.

TABLE II.—PEN *versus* CRATE.

| — | Number of Chickens. | | Weight at beginning of experiment. | | Weight at close of experiment. | | Total increase in weight. | | Average increase in weight per chicken. | | Food Consumed. | | | | Total cost of food. | Cost of food per lb. increase in live weight. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pullets. | Cockerels. | | | | | | | | | Meal. | | Skim-milk. | | | |
| Nos. 1 & 2. | | | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Cts. | Cts. |
| Pen | 1 | 5 | 19 | 9½ | 29 | 1½ | 9 | 8 | 1 | 9⅓ | 36 | 0½ | 66 | 0 | 63·7 | 6·7 |
| Crate | ... ... | 6 | 20 | 10 | 30 | 4 | 9 | 10 | 1 | 9⅔ | 33 | 11½ | 66 | 0 | 60.0 | 6·2 |
| Nos. 3 & 4. | | | | | | | | | | | | | | | | |
| Pen | ..... | 6 | 20 | 9 | 34 | 4½ | 13 | 11½ | 2 | 4½ | 47 | 0 | 60 | 0 | 71·1 | 5·3 |
| Crate | ...... | 6 | 21 | 1 | 33 | 15 | 12 | 14 | 2 | 2⅓ | 41 | 0 | 60 | 0 | 68·4 | 5·6 |

TABLE III.—Proportion of Edible and Non-edible parts, calculated on weight of chickens as killed.

| — | Edible. | | Non-Edible. | | |
|---|---|---|---|---|---|
| | Dressed carcase. | Giblets. | Head and feet. | Feathers. | Entrails, contents of gizzard, &c. |
| Nos. 1 & 2. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Pen | 66·8 | 5·3 | 10·7 | 9·4 | 7·8 |
| Crate | 69·1 | 4·7 | 11·8 | 8·6 | 5·7 |
| Nos. 3 & 4. | | | | | |
| Pen | 68·0 | 5·3 | 10·8 | 8·9 | 6·9 |
| Crate | 69·2 | 4·9 | 10·5 | 9·8 | 5·6 |

Nos. 3 and 4.—The ration used throughout these tests was that employed during the second two weeks of the previous experiment (b), a ration that proved highly satisfactory in the feeding experiments of 1902.

Comparing the results of the pen with those of the crate fed birds, we find that the average increase in live weight per chicken during the feeding trial was somewhat greater for the pen fed birds. These chickens, however, to make this gain consumed more food (see table II.), and a simple calculation shows that, as in the former experiment, the crate-fed birds put on flesh somewhat more cheaply ($\frac{3}{10}$ cent per lb.) than those in the pen. It is worthy of note that both 'pen' and 'crate' birds were fattened at less cost than in the first test (Nos. 1 and 2), there being a difference practically of 1 cent per pound in favour of Nos. 3 and 4. This we believe, in large part, as being consequent upon the better fattening type of the latter.

The proportion of dressed carcase was slightly larger in the case of the crate fed birds, though the difference in this respect was not so marked as with tests Nos. 1 and 2. It was noticed that the dressed birds from the pen were slightly yellower than those from the crate.

These results seem to contradict the conclusions reached in 1902. It is possible that the more favourable temperature for the crated birds this season was the predominating factor in altering the relative economy of the two systems of feeding.

The question of temperature appears to be one well worthy of further investigation. There are also other points upon which we need more information. Until a bird has attained its size, that is, as long as growth in frame continues, it seems to the writer that a certain limited amount of exercise is desirable, if not necessary, for the best results. This stage having been reached—and it will vary somewhat in the age of the chicken with different breeds—it may be found that exercise is no longer necessary and that the additional flesh to round out the bird can be more economically put on in the crate.

### 'ALL GRAIN' *versus* 'GRAIN AND MEAT.'

This experiment was undertaken to ascertain the value of adding a certain proportion of meat meal to the fattening ration.

Each lot consisted of 5 Barred Plymouth Rocks, the birds at the beginning of the test being about 3 months old and very uniform as to weight and build. The feeding was done in the pens with yards attached, and continued for four weeks.

The ration of those fed 'all grain' (No. 5) was as follows:—

Ground oats—4 parts. } Protein ratio, 1:6.
Ground barley—3 parts. } Cost, 1·3 cents per lb.
With a sufficiency of skim-milk.

The ration of those fed 'grain and meat' (No. 6) was:—

Ground oats—4 parts. }
Ground barley—3 parts. } Protein ratio 1:4.
Meat meal—1 part. } Cost, 1·45 cents per lb.

### TABLE IV.—'ALL GRAIN' *versus* 'GRAIN AND MEAT.'

### PEN NO. 5.—'All Grain' Ration.

| No. of Chicken. | Breed. | Sex. | Weight. | | | | | | | | | | Gain in four Weeks. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Aug. 27. | | Sept. 3. | | Sept. 10. | | Sept. 17. | | Sept. 24. | | | |
| | | | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. |
| 8 | Barred Plymouth Rock........ | C. | 2 | 11½ | 3 | 2 | 3 | 9 | 3 | 14 | 4 | 1½ | 1 | 6 |
| 4 | " " ........ | " | 3 | 8½ | 4 | 4 | 4 | 12 | 5 | 5 | 5 | 10½ | 2 | 2 |
| 10 | " " ........ | " | 3 | 4½ | 3 | 14 | 4 | 2 | 4 | 11 | 5 | 0 | 1 | 11½ |
| 14 | " " ........ | " | 3 | 5 | 3 | 15½ | 4 | 7 | 4 | 15½ | 5 | 6½ | 2 | 1½ |
| 11 | " " ........ | " | 3 | 1½ | 3 | 11½ | 4 | 3½ | 4 | 10 | 5 | 0 | 1 | 14½ |

### PEN NO. 6.—'Grain and Meat' Ration.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | Barred Plymouth Rock...... . | C. | 2 | 15½ | 3 | 6 | 4 | 0 | 4 | 6 | 4 | 14½ | 1 | 15 |
| 17 | " " .... ... | " | 3 | 0 | 3 | 8 | 4 | 2 | 4 | 9½ | 5 | 1½ | 2 | 1½ |
| 15 | " " ....... | " | 2 | 15½ | 3 | 10½ | 4 | 3½ | 4 | 11 | 5 | 3½ | 2 | 4 |
| 24 | " " ........ | " | 3 | 2 | 3 | 10½ | 4 | 3½ | 4 | 8½ | 5 | 0 | 1 | 14 |
| 18 | " " ........ | " | 3 | 2½ | 3 | 15 | 4 | 5 | 4 | 12½ | 5 | 3 | 2 | 0½ |

TABLE V.—'ALL GRAIN' *versus* 'GRAIN AND MEAT.'

| Ration. | No. of Chickens. | Weight at beginning of experiment. | | Weight at close of experiment. | | Total increase in weight. | | Average incre'se in weight per Chicken. | | Food Consumed. | | | | Total cost of food. | Cost of food per lb. of increase in live weight. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Meal. | | Skim-milk. | | | |
| | | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Lbs. | Oz. | Cents. | Cents. |
| All grain | 5 | 15 | 15 | 25 | 2½ | 9 | 3½ | 1 | 13½ | 33 | 1 | 46 | 0 | 49·8 | 5·4 |
| Grain and meat | 5 | 15 | 3½ | 25 | 6½ | 10 | 3 | 2 | 0⅗ | 34 | 13 | 46 | 0 | 57·2 | 5·6 |

TABLE VI.—PROPORTION of Edible and Non-edible parts, calculated on weight of Chicken as killed.

| Ration. | Edible. | | Non-Edible. | | |
|---|---|---|---|---|---|
| | Dressed carcase. | Giblets. | Head and feet. | Feathers. | Entrails, contents of gizzard, &c. |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| All grain | 67·7 | 5·3 | 11·5 | 9·6 | 5·7 |
| Grain and meat | 67·8 | 5·3 | 11·1 | 9·4 | 6·3 |

At the outset, the 5 chickens put on the 'grain and meat' ration weighed in all 11½ ounces less than those to be fed 'all grain'; at the close of the experiment their weight exceeded that of the grain fed chickens by 4 ounces. In other words, the 'grain and meat' birds gained 15½ ounces (or a little more than 3 ounces per chicken) more than the 'all grain' fed chickens, and this gain resulted from the consumption of 1 lb. 12 oz. more food.

Leaving out of consideration for the moment their relative cost, it will be interesting to ascertain the relative value of these two rations in flesh production. Since the amount of skim-milk consumed was the same for each set, we may neglect its consideration in the calculation. In the case of the 'all grain' test, the birds ate 33 lbs. 1 oz. and gained 9 lbs. 2½ oz., or for 1 lb. of increase in live weight 3·586 lbs. of the ration were consumed. With the 'grain and meat' ration, 34 lbs. 13 oz. were eaten, with a concomitant gain of 10 lbs. 3 oz. in live weight, or for 1 lb. of increase, 3·417 lbs. of meal were consumed.

These results show an increased efficiency for the ration containing the meat scrap. When, however, the relative cost of the ration is taken into account, the 'all grain' has slightly the advantage (by reason of it costing less), the difference being two-tenths of a cent per lb. of increase more in the case of the 'grain and meat' ration.

On killing and dressing, the two lots were found to be remarkably similar as regards plumpness and weight, due largely, the writer thinks, to the uniformity of type already referred to. They furnished identical data as regards the percentage of dressed carcase (table VI), and were only distinguished into groups by the slightly yellow tinge of the 'all grain' fed birds; the chickens from the 'grain and meat' ration gave a perfectly white flesh.

# SATURATED LIME-WATER FOR THE PRESERVATION OF EGGS.

By Frank T. Shutt, M.A.

*Chemist, Dominion Experimental Farms.*

The solubility of lime in water at ordinary temperatures is one part in 700 parts of water. Such a solution would be termed saturated lime water. Translated into lbs. and gallons, this means that one lb. of lime is sufficient to saturate 70 gallons of water. However, owing to impurities in commercial lime, it is well to use more than is called for in this statement. It may not, however, be necessary, if good, freshly burnt quick lime can be obtained, to employ as much as was at first recommended, namely, 2 to 3 lbs. to 5 gallons of water. With such lime as is here referred to, one could rest assured that 1 lb. to 5 gallons (50 lbs.) would be ample, and that the resulting lime-water would be thoroughly saturated. The method of preparation is simply to slake the lime with a small quantity of water, and then stir the milk of lime so formed into the 5 gallons of water. After the mixture has been kept well stirred for a few hours, it is allowed to settle. The supernatant liquid, which is now 'saturated' lime-water, is drawn off and poured over the eggs, previously placed in a crock or water-tight barrel.

As exposure to the air tends to precipitate the lime (as carbonate), and thus weaken the solution, the vessel containing the eggs should be kept covered. The air may be excluded by a covering of sweet oil, or by sacking upon which a paste of lime is spread. If after a time there is any noticeable precipitation of the lime, the lime-water should be drawn off or siphoned off and replaced with a further quantity newly prepared.

It is essential that attention be paid to the following points:—

1. That perfectly fresh eggs only be used.

2. That the eggs should throughout the whole period of preservation be completely immersed.

Although not necessary to the preservation of the eggs in a sound condition, a temperature of 40°F. to 45°F. will no doubt materially assist towards retaining good flavour, or rather in arresting that 'stale' flavour so characteristic of packed eggs.

Respecting the addition of salt, it must be stated that our experiments, conducted now throughout three seasons, do not show any benefit to be derived therefrom; indeed, salt appears to impart a limey flavour to the egg, probably by inducing an interchange of the fluids within and without the eggs.

Water glass (sodium silicate), has been extensively experimented with, using solutions varying from 2 per cent to 10 per cent. Although in the main the results have been fairly satisfactory, we are of the opinion that lime-water is fully its equal, if not its superior, as a preservative, and that this latter preservative is both cheaper and pleasanter to use there can be no doubt.

# EXPERIMENTAL FARM FOR THE MARITIME PROVINCES.

## REPORT OF R. ROBERTSON, SUPERINTENDENT.

NAPPAN, N.S., November 30, 1903.

To DR. WM. SAUNDERS,
Director Dominion Experimental Farms,
Ottawa.

SIR,—I have the honour to submit herewith my annual report of operations on the experimental farm for the maritime provinces at Nappan, N.S.

The season has not been quite as favourable for farm crops as that of 1902. The early part was particularly dry, and crops generally made a poor start, from which they never completely recovered. Hay was quite below the average and the new take of clover is the poorest we have had for years. Owing to favourable weather after about June 25th roots were a fairly good crop, while corn was poor. Pasture was poor the whole season.

I wish to again acknowledge my indebtedness for valuable assistance rendered by Mr. J. Thomas Coates, farm foreman, who has kept all records of crop experiments, and to Mr. R. Donaldson, herdsman, who has kept all records of live stock experiments, each doing so in a careful and painstaking manner.

## WEATHER.

December opened with no frost in the ground, but on the 2nd it was well frozen up. A light snow on the 4th was followed by a heavy fall on the 5th, accompanied by high winds, which made it drift badly. The temperature fell to zero on the 7th, and on the 9th 10° below zero, with 16° below on the 10th. The temperature continued below zero to the 16th, with one day only above that point. On the 8th, 6 inches of snow fell. This drifted badly on the 9th, 10th and 11th, when one of the coldest winds and snowstorms experienced in many years blocked the roads so that it was necessary to break them out. The 17th was moderate, with rain, and the snow all went off. This was followed by cold and rain again on the 22nd. Slight snow fell occasionally from the 22nd to the 29th, but not enough to make sleighing. It snowed sufficient for sleighing on the 29th, but it went off again the following day.

January commenced fine, with no very cold weather until the 8th. Snow fell to make good sleighing on the 7th, which continued good for the month. The temperature went below zero on the 10th, 11th, 14th, 19th, 20th, 24th, 25th, 26th and 27th, registering 2°, 4°, 2°, 12°, 9°, 4°, 4°, 2°, 4° on these dates respectively.

February opened cold and fine, with occasional snow and rain to the 17th, when we had a snow storm, followed by cold weather to the 23rd. Another snow and wind storm prevailed on the 23rd and 28th. The temperature went below zero only three times during this month, on the 8th, 18th and 20th, when 2°, 5°, 5°, respectively was registered.

March opened fine but mild, taking off the snow. It snowed on the 6th, but moderated again, and it all went off on the 7th. The weather was fine and mild to the 17th, and it continued more or less broken to the end of the month. Very little snow fell during the month.

April came in cold, but broken weather set in and continued more or less wet until the 20th. Some snow fell on the 16th, 17th, 18th and 20th. The rainfall during the month was 3·57 inches. The first seeding was done April 27th.

May commenced cool but fine. The month throughout was warmer than usual. Frost was recorded seven times during the month, on the 2nd, 3rd, 10th, 13th, 16th, 25th and 26th, there being 3°, 7°, 2°, 1°, 10°, 8° and 4°, respectively on these dates. There was little rainfall during the month, only ·68 inches.

June was unusually fine and dry, continuing with one exception to the 25th. Crops and pastures suffered greatly for want of rain during this period, and many of the June sown roots and vegetable seed failed to germinate quickly on account of a lack of moisture. A slight rainfall on the 14th and 15th, but only ·20 inch, not doing much good. On the 25th and 26th, however, a fall of 1·69 inches thoroughly wet the ground, doing a vast amount of good, and considerable seed that had been in the ground some weeks, and remained dormant, on account of a lack of moisture germinated. From this date forward all roots and grain crops did exceptionally well. From this to the end of the month there were four light rains. The total rainfall for the month was 2·29 inches. The only frosts recorded in the month was on 1st, 2nd, 4th and 5th, when 4°, 3°, 4° and 3° was registered, respectively, at these dates. The month throughout was not as warm as usual, and as a result the corn crop made a poor start.

July was more or less broken, but with no very heavy rains. The rainfall for the month was 2·07 inches. The month generally was not as warm as usual. On the 9th 80° was registered, and on the 11th, 82°, these being the two warmest days.

August was fine to the 7th, when rain fell, followed by another rainfall on the 10th. From the 10th to the 18th was fine, when rain again occurred. The remainder of August was practically free from rain, with the exception of the last day. The rainfall during the month was 2·40 inches. This month throughout was cooler than generally experienced here, and at no time during the month did the temperature go above 76°, that point being reached only once, August 20th. On the 23rd, very high tides, accompanied with high winds, did considerable damage to marsh lands by breaking and flowing over the dykes.

September was showery to the 9th. From the 9th to the 17th was fine, with two days wet weather, on the 17th and 18th, and fine again to the 28th, with showery weather to the end of the month. The total rainfall for the month was 3·63 inches. The month averaged about up to the usual temperature. The thermometer only once went above 76°, and that was on the 14th, when 80° was recorded.

October commenced with fine weather, but we had a heavy rain on the 10th and 11th, of 2·85 inches. This was followed by changeable weather to the 18th, when 2·15 inches of rain fell, accompanied by high winds, which shook many apples off the trees. The remainder of the month was more or less changeable. The rainfall for the month was 5·78 inches. The first frost of the season was October 4th, when 6° of frost was registered. There was little frost during the month.

November up to the 20th was very mild, with very little frost. The month, however, was unusually wet up to that time. On the 17th, 18th and 19th 3·15 inches of rain fell. The total rainfall for the month was 7·98 inches. This made it difficult to harvest root crops on the wet land and made fall ploughing backward. From the 20th to the end of the month was more or less frozen and little ploughing was done after that date.

## EXPERIMENTS WITH OATS.

In this uniform test of varieties forty-five different sorts were grown in plots of one-fortieth acre each. These plots all received the same treatment and were on soil practically uniform throughout.

The soil was a clay loam. The previous crop was mangels, for which crop twenty one-horse cart loads of manure were applied. The ground was ploughed in the fall, and in the spring it was harrowed twice with the spring tooth and once with the smoothing harrows. The seed was sown May 4, at the rate of 2½ bushels per acre, with the seed drill. The seed for these plots was from heads selected in the field, at harvest time, before cutting the various plots the previous season. The ground was seeded down with 3 pounds alsike clover, 7 pounds Mammoth Red clover and 12 pounds Timothy seed per acre, by means of a grass seeder attached to the seeder.

No fertilizer was used this season, the grain started slowly and irregularly, made fair growth, did not rust and the seed filled out well. Some smut was noticed in many of the plots; some of the straw lodged, but generally speaking was strong and stood up well.

OATS.—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening | Number of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Inch's | | Inches. | | Lbs. | Bush. | Lbs. | Lbs. |
| 1 | Sensation | Aug. 26. | 114 | 42—46 | Stiff | 6—8 | Branching | 7,040 | 98 | 28 | 37 |
| 2 | Twentieth Century | " 24. | 112 | 42—46 | " | 6—8 | " | 6,600 | 97 | 22 | 38 |
| 3 | Thousand Dollar | " 26. | 114 | 45—48 | " | 6—8 | " | 7,080 | 97 | 22 | 37½ |
| 4 | Waverley | " 31. | 119 | 45—50 | " | 6—9 | " | 5,440 | 97 | 22 | 37 |
| 5 | Siberian | " 26. | 114 | 45—49 | " | 6—9 | " | 6,960 | 96 | 16 | 35 |
| 6 | Banner | " 25. | 113 | 43—48 | " | 6—8 | " | 6,520 | 95 | 10 | 38 |
| 7 | Joanette | " 22. | 110 | 36—40 | Medium | 6—9 | " | 5,800 | 94 | 4 | 36 |
| 8 | White Giant | " 31. | 119 | 44—48 | Stiff | 6—9 | " | 6,600 | 94 | 4 | 37½ |
| 9 | Abundance | " 25. | 113 | 43—47 | " | 6—8 | " | 6,400 | 92 | 32 | 36 |
| 10 | Goldfinder | " 31. | 119 | 47—52 | " | 6—9 | " | 5,800 | 92 | 32 | 35 |
| 11 | Danish Island | " 27. | 115 | 43—47 | " | 5—8 | " | 6,680 | 90 | 20 | 37½ |
| 12 | Improved Ligowo | " 26. | 114 | 43—48 | " | 6—8 | " | 6,400 | 89 | 14 | 37 |
| 13 | Lincoln | " 25. | 113 | 43—46 | " | 5—7 | " | 6,840 | 89 | 14 | 37½ |
| 14 | Wide Awake | " 26 | 114 | 43—48 | " | 5—8 | " | 6,800 | 88 | 8 | 38 |
| 15 | White Schonen | " 26. | 114 | 42—46 | " | 5—8 | " | 6,520 | 88 | 8 | 37½ |
| 16 | Olive Black | " 28. | 116 | 46—52 | " | 6—9 | Sided | 6,600 | 88 | 8 | 37 |
| 17 | Swedish Select | " 27. | 115 | 41—46 | " | 5—7 | Branching | 5,600 | 87 | 2 | 35 |
| 18 | Pioneer | " 20. | 108 | 40—44 | " | 6—9 | " | 5,480 | 85 | 30 | 39 |
| 19 | Salines | Sept. 2. | 121 | 44—50 | " | 6—9 | " | 6,600 | 85 | 30 | 36 |
| 20 | Black Beauty | Aug. 20. | 108 | 44—48 | " | 7—9 | " | 5,000 | 84 | 24 | 35 |
| 21 | Early Golden Prolific | " 28. | 116 | 46—50 | " | 6—8 | " | 6,600 | 84 | 24 | 37½ |
| 22 | Improved American | " 26. | 114 | 42—46 | " | 6—8 | " | 5,720 | 84 | 24 | 35 |
| 23 | Wallis | " 26. | 114 | 38—42 | " | 5—8 | " | 5,400 | 83 | 18 | 37 |
| 24 | Mennonite | " 25. | 113 | 42—46 | " | 6—8 | " | 6,560 | 82 | 12 | 37½ |
| 25 | Golden Fleece | " 27. | 115 | 40—46 | " | 6—8 | " | 5,800 | 82 | 12 | 35 |
| 26 | Holstein Prolific | " 25. | 113 | 44—47 | " | 5—7 | " | 4,960 | 82 | 12 | 36½ |
| 27 | Bavarian | " 26. | 114 | 42—46 | " | 5—7 | " | 6,520 | 81 | 6 | 37 |
| 28 | Pense Black | " 28. | 116 | 43—52 | " | 6—9 | Sided | 6,000 | 81 | 6 | 38 |
| 29 | Milford Black | " 26. | 114 | 41—45 | " | 6—8 | " | 5,600 | 80 | 0 | 39 |
| 30 | Golden Tartarian | Sept. 2. | 121 | 42—46 | " | 6—9 | " | 5,480 | 77 | 22 | 35 |
| 31 | Kendal Black | Aug. 26. | 114 | 40—45 | " | 6—8 | " | 5,400 | 75 | 10 | 39 |
| 32 | Kendal White | " 26. | 114 | 40—45 | " | 6—8 | " | 6,400 | 75 | 10 | 39 |
| 33 | Milford White | " 26. | 114 | 40—45 | " | 6—8 | " | 6,280 | 74 | 4 | 38½ |
| 34 | Olive White | " 28. | 116 | 46—52 | " | 6—9 | " | 5,400 | 71 | 26 | 38 |
| 35 | American Beauty | " 25. | 113 | 40—45 | " | 5—7 | Branching | 4,720 | 71 | 26 | 37 |
| 36 | Tartar King | " 21. | 109 | 41—49 | " | 6—8 | Sided | 4,800 | 70 | 20 | 37 |
| 37 | New Zealand | Sept. 1. | 120 | 42—46 | " | 6—8 | " | 5,200 | 70 | 20 | 35 |
| 38 | Pense White | Aug. 28. | 116 | 44—52 | " | 6—9 | " | 5,600 | 69 | 14 | 39 |
| 39 | Scotch Potato | " 27. | 115 | 40—44 | " | 6—8 | Branching | 5,880 | 68 | 8 | 38 |
| 40 | Golden Beauty | " 26. | 114 | 38—43 | " | 5—7 | " | 4,400 | 64 | 24 | 36 |
| 41 | Buckbee's Illinois | " 29. | 117 | 40—45 | " | 5—7 | " | 5,000 | 62 | 12 | 35 |
| 42 | Columbus | " 27. | 115 | 38—45 | " | 5—7 | " | 3,600 | 62 | 12 | 33 |
| 43 | Golden Giant | " 31. | 119 | 44—47 | " | 6—9 | Sided | 3,800 | 60 | 0 | 35 |
| 44 | American Triumph | " 29. | 117 | 42—46 | " | 6—9 | Branching | 3,880 | 58 | 28 | 34 |
| 45 | Irish Victor | " 26. | 114 | 36—40 | " | 6—8 | " | 3,849 | 58 | 28 | 36 |

### OATS—NOT INCLUDED IN THE UNIFORM TRIAL PLOTS.

These were all sown on May 4 in plots of one-fortieth acre each adjoining the Uniform Trial Plots.

| Number. | Name of Variety. | Date of Sowing. | Date of Ripening. | Number of days maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Inches. | | In. | | Lbs. | Bush. | Lbs. | Lbs. |
| 1 | Abysinnia ............ | May 4.. | Aug. 24 | 112 | 42—46 | Stiff.. .... | 6—8 | Branching | 6,000 | 88 | 8 | 37½ |
| 2 | Rosedale.... .......... | " 4.. | " 24 | 112 | 40—45 | " ..... | 6—9 | Sided..... | 6,600 | 87 | 2 | 40 |
| 3 | Early Blossom ........ | " 4.. | " 24 | 112 | 40—46 | " ..... | 6—8 | " .. | 6,600 | 85 | 30 | 40 |
| 4 | Cream Egyptian.. .... | " 4.. | " 25 | 113 | 42—47 | " ..... | 5—7 | Branching | 6,400 | 84 | 24 | 39 |
| 5 | Salzer's Big 4......... | " 4 . | " 22 | 110 | 44—48 | " ..... | 6—9 | Sided.... | 5,880 | 84 | 24 | 37 |
| 6 | White Russian........ | " 4.. | " 25 | 113 | 42—45 | " ..... | 6—8 | Branching | 5,600 | 74 | 4 | 37½ |
| 7 | Cromwell. ............ | " 4.. | " 29 | 117 | 44—48 | " ..... | 5—7 | " . | 4,800 | 72 | 32 | 34 |
| 8 | Black Mesdag......... | " 4.. | " 17 | 105 | 44—48 | " ..... | 7—9 | " . | 5,080 | 69 | 14 | 35 |
| 9 | Oderbruch ............ | " 4.. | " 26 | 114 | 42—46 | " ..... | 6—8 | Sided. .. | 4,680 | 68 | 8 | 37 |
| 10 | Newmarket. .......... | " 4.. | " 26 | 114 | 42—45 | Medium.. | 6—8 | Branching | 4,200 | 67 | 2 | 37 |
| 11 | Pense..... ............ | " 4.. | " 26 | 114 | 40—44 | Stiff...... | 6—8 | Sided..... | 5,200 | 64 | 24 | 38 |
| 12 | P.E.I. Black....... .. | " 4.. | " 24 | 112 | 38—42 | Medium.. | 6—8 | Branching | 5,400 | 58 | 28 | 36 |

## EXPERIMENTS WITH BARLEY.

These comparative tests were conducted on land similar to that used for the oat plots, which was practically of a uniform character. The soil was a clay loam, having been in mangels last year, and manured for that crop with twenty one-horse cart loads of stable manure per acre. After the mangel crop was removed the land was ploughed, and this spring it was worked twice with the spring tooth and once with the smoothing harrow. No fertilizer was used for the crop this season.

Twenty varieties of six-rowed and fifteen of two-rowed sorts were sown, all on May 13, in one-fortieth acre plots, at the rate of 2 bushels per acre. The seed for these plots was from heads selected in the field, at harvest time, before cutting the various plots, the previous season. Timothy and clover seed was sown at the same time at the rate of 3 pounds Alsike, 7 pounds Mammoth Red clover and 12 pounds of Timothy seed per acre. The plants started slowly and irregular, but good growth was made later in the season. There was no rust and the grain filled out well. Some smut was noticed in some of the plots. The information given in the following table was obtained from the experiments:—

BARLEY, SIX-ROWED—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | Lbs. | Bush. | Lbs. | Lbs. |
| 1 | Oderbruch | Aug. 19 | 98 | 42—46 | Stiff | 2 —2½ | 6,400 | 66 | 32 | 48½ |
| 2 | Empire | " 21 | 100 | 40—41 | " | 2 —3 | 6,520 | 65 | 40 | 48½ |
| 3 | Trooper | " 20 | 99 | 42—46 | " | 2 —3 | 6,400 | 65 | .. | 48¼ |
| 4 | Nugent | " 25 | 104 | 38—43 | " | 2 —2½ | 6,440 | 64 | 8 | 48 |
| 5 | Common six-rowed | " 20 | 99 | 40—45 | " | 2 —2½ | 6,280 | 63 | 16 | 48 |
| 6 | Odessa | " 18 | 97 | 42—45 | " | 2 —3 | 6,200 | 60 | 40 | 48 |
| 7 | Mensury | " 22 | 101 | 40—45 | " | 2 —3 | 6,800 | 60 | .. | 48 |
| 8 | Albert | " 20 | 99 | 41—44 | Medium | 2 —2½ | 6,120 | 59 | 8 | 48½ |
| 9 | Baxter | " 20 | 99 | 40—44 | Stiff | 2 —3 | 6,600 | 59 | 8 | 48 |
| 10 | Stella | " 25 | 104 | 38—42 | " | 2 —3 | 5,880 | 58 | 16 | 48 |
| 11 | Royal | " 20 | 99 | 37—41 | Medium | 2 —2½ | 6,200 | 58 | 16 | 47½ |
| 12 | Mansfield | " 22 | 101 | 41—46 | Stiff | 2 —3 | 6,240 | 55 | 40 | 47½ |
| 13 | Summit | " 25 | 104 | 38—42 | " | 2 —3 | 6,120 | 54 | 8 | 48 |
| 14 | Argyle | " 21 | 100 | 40—43 | " | 2 —3 | 6,040 | 54 | 8 | 47 |
| 15 | Brome | " 24 | 103 | 40—44 | " | 2 —3 | 5,400 | 53 | 16 | 48 |
| 16 | Yale | " 25 | 104 | 38—42 | Medium | 2 —2½ | 5,880 | 53 | 16 | 48 |
| 17 | Garfield | " 21 | 100 | 40—43 | " | 2 —2½ | 5,400 | 50 | .. | 48½ |
| 18 | Champion | " 17 | 96 | 43—48 | Stiff | 2½—3 | 5,880 | 49 | 8 | 39 |
| 19 | Claude | " 20 | 99 | 39—42 | Medium | 2 —2½ | 5,520 | 48 | 16 | 47⅓ |
| 20 | Rennie's Improved | " 20 | 99 | 40—43 | " | 2 —2½ | 5,800 | 45 | 40 | 48½ |

BARLEY TWO-ROWED—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Danish Chevalier | Aug. 22 | 101 | 36—42 | Stiff | 3 —4 | 5,400 | 65 | 0 | 51 |
| 2 | Newton | " 22 | 101 | 41—45 | " | 2½—3 | 4,800 | 64 | 8 | 50 |
| 3 | Beaver | " 21 | 100 | 35—37 | Medium | 2½—3½ | 4,200 | 60 | 40 | 50 |
| 4 | Canadian Thorpe | " 22 | 101 | 36—42 | Stiff | 2 —3 | 4,400 | 59 | 8 | 49 |
| 5 | French Chevalier | " 22 | 101 | 38—43 | " | 3 —4 | 4,600 | 58 | 16 | 50 |
| 6 | Invincible | " 24 | 103 | 38—42 | " | 2 —3 | 4,480 | 55 | 40 | 50½ |
| 7 | Standwell | " 24 | 103 | 38—42 | " | 2 —3 | 4,400 | 52 | 24 | 50 |
| 8 | Durham | " 22 | 101 | 40—46 | " | 2½—3½ | 4,400 | 49 | 8 | 48 |
| 9 | Fulton | " 24 | 103 | 39—43 | " | 2 —3 | 4,600 | 48 | 16 | 48 |
| 10 | Gordon | " 22 | 101 | 40—46 | " | 2 —3 | 3,720 | 46 | 32 | 48 |
| 11 | Logan | " 22 | 101 | 40—46 | " | 2½—3½ | 4,880 | 45 | 40 | 48 |
| 12 | Sidney | " 22 | 101 | 38—42 | Medium | 2½—3¼ | 4,720 | 43 | 16 | 48 |
| 13 | Clifford | " 21 | 100 | 40—44 | Strong | 2½—3½ | 3,600 | 42 | 24 | 49 |
| 14 | Harvey | " 22 | 101 | 40—46 | " | 2½—3½ | 3,800 | 40 | 40 | 51 |
| 15 | Jarvis | " 22 | 101 | 39—43 | Medium | 3 —4 | 3,600 | 40 | 0 | 48 |

## EXPERIMENTS WITH SPRING WHEAT.

The ground selected for these plots was a light clay loam which was in corn the previous year. The land was manured for the corn crop, with twenty one-horse cart loads of stable manure per acre. The land was ploughed after the corn crop was removed, and this spring was worked by twice harrowing with the spring tooth and once with the smoothing harrow. The seed was sown with the seed drill April 29, at the rate of 1¾ bushels per acre. The seed for these plots was from heads selected in the field at harvest time, before cutting the various plots, the previous season. The land was seeded down at the same time, with a mixture of 3 pounds Alsike clover, 7 pounds Mammoth Red clover and 12 pounds of Timothy seed per acre.

Sixty-one varieties were sown in one-fortieth acre plots, all of which received the same treatment. The seed germinated very slowly, during which time the weeds got a better start than usual. The grain made a fair growth. The straw was rather light, and the grain did not fill out as well as it usually does. There was no rust, but a few heads of smut were occasionally noticed. The yield from these plots is given in the following table:—

SPRING WHEAT—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | Lbs. | Bush. | Lbs. | Lbs. |
| 1 | Byron.... .... .... | Aug. 26 | 119 | 38—42 | Medium.. | 2 —3 | Bearded.... | 3880 | 42 | 40 | 60½ |
| 2 | Early Riga...... .... | " 22 | 115 | 42—47 | Stiff...... | 2 —3 | Beardless... | 4200 | 42 | 0 | 61 |
| 3 | Chester............ | " 27 | 120 | 40—45 | " .... | 2 —3¼ | " ... | 3600 | 40 | 0 | 61 |
| 4 | Wellman's Fife..... | " 31 | 124 | 44—48 | " ..... | 2½—3½ | " ... | 5000 | 38 | 0 | 61 |
| 5 | Essex.............. | " 29 | 122 | 44—48 | " ..... | 2½—3½ | " ... | 4400 | 38 | 0 | 59 |
| 6 | Minnesota No. 149. .. | " 31 | 124 | 40—43 | " ..... | 2 —3 | " ... | 4320 | 37 | 20 | 61 |
| 7 | Crawford . .. ...... | " 29 | 122 | 40--44 | " ..... | 2 —3 | " ... | 4680 | 36 | 40 | 61 |
| 8 | Red Fife.......... .... | " 28 | 121 | 40—44 | " ..... | 2 —3¼ | " ... | 5200 | 36 | 40 | 60 |
| 9 | Rio Grande. ........ | " 27 | 120 | 42—46 | " ..... | 2½—3½ | Bearded.. .. | 4800 | 36 | 40 | 61 |
| 10 | Admiral..... ........ | " 29 | 122 | 43—48 | " ..... | 2½—3 | " ... | 4680 | 36 | 0 | 60 |
| 11 | White Fife.......... | " 31 | 124 | 43—48 | " ..... | 2½—3½ | Beardless... | 4800 | 36 | 0 | 61 |
| 12 | Laurel.......... ... | " 31 | 124 | 41—45 | " ..... | 2½—4 | " ... | 4400 | 36 | 0 | 61 |
| 13 | White Connell....... | " 31 | 124 | 38—45 | " ..... | 2 —3 | " ... | 4600 | 35 | 20 | 61 |
| 14 | Monarch........... . | " 29 | 122 | 42—46 | " ..... | 2 —3 | " ... | 4280 | 35 | 20 | 60½ |
| 15 | Red Swedish......... | " 29 | 122 | 43—46 | " ..... | 2½—3¼ | Bearded.... | 4640 | 35 | 20 | 59½ |
| 16 | Norval.............. | " 27 | 120 | 40—44 | Medium.. | 2 —3 | " ... | 3800 | 34 | 40 | 60¼ |
| 17 | Dawn............... | " 27 | 120 | 42—46 | " .. | 2 —3 | Beardless... | 4600 | 34 | 0 | 60 |
| 18 | Clyde.. .. ...... .... | " 29 | 122 | 40—44 | Stiff...... | 2 —3 | " ... | 4200 | 34 | 0 | 60½ |
| 19 | Australian, No. 23.... | " 31 | 124 | 40—45 | " ..... | 2 —3 | " ... | 4400 | 33 | 20 | 60 |
| 20 | Advance............ | " 25 | 118 | 43—47 | " ..... | 2½—3¼ | Bearded.... | 4800 | 32 | 40 | 60 |
| 21 | Minnesota No. 181.... | " 31 | 124 | 44—48 | " ..... | 2½—3½ | Beardless... | 4720 | 32 | 0 | 60 |
| 22 | Australian, No. 13.... | " 31 | 124 | 38—42 | " ..... | 2 —3 | " ... | 3800 | 32 | 0 | 60 |
| 23 | Bishop........... .. | " 27 | 120 | 40—46 | " . ... | 2 —3 | " ... | 4200 | 31 | 20 | 60 |
| 24 | Crown.............. | " 27 | 120 | 41—46 | Medium.. | 2 —3 | Bearded.... | 4400 | 31 | 20 | 60 |
| 25 | Herrison Bearded . .. | " 27 | 120 | 38—40 | " .. | 1 —1½ | " ... | 3880 | 31 | 20 | 60 |
| 26 | White Russian....... | " 29 | 122 | 40—46 | Stiff...... | 2 —3¼ | Beardless... | 4120 | 30 | 40 | 60 |
| 27 | Japanese ......... . | " 29 | 122 | 40—45 | " ..... | 2 —3 | Bearded .... | 4920 | 30 | 40 | 60 |
| 28 | Pringle's Champlain.. | " 28 | 121 | 41—46 | " ..... | 2 —3 | " ... | 3720 | 30 | 0 | 60 |
| 29 | Vernon......... ... | " 28 | 121 | 43—46 | " ..... | 2 —3 | " ... | 3760 | 30 | 0 | 60 |
| 30 | Alpha..... ...... . . | " 27 | 120 | 40—46 | " ..... | 2 —3 | " ... | 4400 | 30 | 0 | 60 |
| 31 | Australian No. 9 ... | " 31 | 124 | 40—43 | " ..... | 2 —3 | Beardless... | 3800 | 29 | 20 | 61 |
| 32 | Robin's Rust Proof... | " 31 | 124 | 38--45 | Medium.. | 2 —3 | " ... | 3320 | 28 | 40 | 61 |
| 33 | Stanley............. | " 28 | 121 | 40—45 | " .. | 2 —3 | " ... | 4600 | 28 | 40 | 60 |
| 34 | Minnesota, No. 163.. | " 31 | 124 | 40—45 | Stiff.. ... | 2½—3 | " ... | 4400 | 28 | 40 | 60 |
| 35 | Preston............. | " 28 | 121 | 42—46 | " ..... | 2 —3 | Bearded.... | 4400 | 28 | 0 | 60 |
| 36 | Australian, No. 10.... | " 31 | 124 | 38—43 | " ..... | 2 —3 | Beardless... | 3600 | 27 | 20 | 59½ |
| 37 | Huron ............. | " 28 | 121 | 40—43 | Medium.. | 2 —3 | Bearded.... | 3320 | 26 | 40 | 61 |
| 38 | Percy.............. | " 29 | 122 | 44—48 | Stiff...... | 2 —3 | Beardless... | 4000 | 26. | 40 | 60 |
| 39 | Minnesota No. 169.... | " 31 | 124 | 40—45 | " . ... | 2 —3 | " ... | 3400 | 26 | 0 | 60 |
| 40 | Angus.............. | " 29 | 122 | 38—41 | " ..... | 2 —3 | " ... | 3400 | 26 | 0 | 60 |
| 41 | Cassel.............. | " 31 | 124 | 40—44 | " ..... | 2 —3 | " ... | 3200 | 26 | 0 | 61 |
| 42 | Countess.... ........ | " 29 | 122 | 40—45 | " ..... | 2 —3 | " ... | 3400 | 25 | 20 | 59 |
| 43 | Progress........... . | " 28 | 121 | 43—48 | Stiff...... | 2 —3 | " ... | 3640 | 24 | 40 | 59 |
| 44 | Hungarian.......... | " 28 | 121 | 40—44 | Medium.. | 2 —2½ | Bearded.... | 3000 | 24 | 40 | 60 |
| 45 | Colorado ........... | " 25 | 118 | 43—47 | Stiff .... | 2½—3 | " ... | 4480 | 24 | 0 | 60 |
| 46 | Weldon. .... ..... . | " 29 | 122 | 42—46 | " ..... | 2½—3¼ | Beardless... | 2720 | 23 | 20 | 60 |
| 47 | Red Fern.... .. .... | " 28 | 121 | 40—43 | " ..... | 2 —3 | Bearded.... | 4000 | 22 | 0 | 61 |
| 48 | Goose. .. . ........ | " 27 | 120 | 40—43 | Medium.. | 1½—2 | " ... | 3560 | 22 | 0 | 60 |
| 49 | Roumanian .... .... | " 29 | 122 | 37—42 | " .. | 1 —2 | " ... | 3240 | 21 | 20 | 60½ |
| 50 | Benton .... ........ | " 29 | 122 | 40—44 | " .. | 2 —3 | Beardless... | 3160 | 20 | 40 | 60 |
| 51 | Australian No. 27.... | " 31 | 124 | 38—42 | Stiff..... | 2 —3 | " ... | 3200 | 20 | 0 | 59½ |
| 52 | Blair............... | " 29 | 122 | 43—47 | " ..... | 2½—3 | " ... | 3720 | 20 | 0 | 59½ |
| 53 | Fraser............. | " 27 | 120 | 40—45 | " ..... | 2 —3 | Bearded.... | 3480 | 19 | 20 | 59½ |
| 54 | Cartier... .... . . | " 28 | 121 | 35—40 | Medium.. | 2 —3 | " ... | 3120 | 18 | 40 | 58 |
| 55 | Australian No. 25.... | " 31 | 124 | 40—43 | Stiff...... | 2 —3 | Beardless... | 3040 | 18 | 0 | 59 |
| 56 | Australian No. 19.. . | " 31 | 124 | 40—45 | " ..... | 2 —3 | " ... | 2920 | 17 | 20 | 59 |
| 57 | Hastings............ | " 29 | 122 | 35—40 | Medium.. | 2 —3 | " ... | 2540 | 16 | 40 | 58 |
| 58 | Plumper.... ....... | " 29 | 122 | 40—43 | " .. | 2 —3 | Bearded.. . | 2440 | 16 | 40 | 59 |
| 59 | Medeah............. | " 29 | 122 | 30—35 | Weak .... | 1 —2 | " ... | 2120 | 16 | 0 | 53 |
| 60 | Mishriki............ | " 29 | 122 | 20—25 | " ..... | 1 —1½ | " ... | 2080 | 16 | 0 | 52 |

## EXPERIMENTS WITH EMMERS AND SPELTS.

Experiments have been conducted this season with two varieties of emmer and two of spelt, with the following results. They were all sown on April 29, on land adjoining the wheat plots:—

| Name of Variety. | Date of Ripening. | No. of Days Maturing. | Yield per Acre. | | Weight per Measured Bushel. |
|---|---|---|---|---|---|
| | | | Bush. | Lbs. | Lbs. |
| White Spelt | Sept. 8. | 132 | 29 | 20 | 35 |
| White Bearded Spelt | " 2 | 126 | 28 | 40 | 34 |
| Common Emmer (Speltz) | Aug. 29. | 122 | 25 | 20 | |
| White Emmer | Sept. 2. | 126 | 23 | 20 | |

## EXPERIMENTS WITH PEASE.

Forty varieties of pease were sown May 9 in one-fortieth acre plots. The land was a light clay loam, similar to that chosen for the wheat plots. This land was previously in corn and was manured for that crop with twenty one-horse cart loads of stable manure per acre. This ground was ploughed after the corn crop was removed, in the fall of 1902, and the following spring was worked up by harrowing twice with the spring tooth and once with the smoothing harrow.

The seed was sown with the seed drill, and Timothy and clover mixed, at the rate of 3 pounds Alsike clover, 7 pounds Mammoth Red clover and 12 pounds Timothy seed per acre was sown at the same time. The crop was light. The plants did not make strong growth, but the quality of the seed was good. The following results were obtained from this experiment:—

PEASE—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Character of Growth. | Length of Straw. | Length of Pod. | Size of Pea. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | In. | In. | | Bush. | Lbs. | Lbs. |
| 1 | Arthur | Sept. 9.. | 123 | Fair | 34—38 | 2 —2½ | Medium | 44 | 40 | 62 |
| 2 | Archer | " 10.. | 124 | " | 36—40 | 2 —2¼ | " | 42 | .. | 62 |
| 3 | Crown | " 7.. | 121 | " | 30—36 | 1½—2 | Small .. | 40 | .. | 62 |
| 4 | Macoun | " 10.. | 124 | Strong | 45—48 | 2 —3 | Large .. | 38 | 40 | 61 |
| 5 | Mummy | " 9.. | 123 | Fair | 36—40 | 2 —2½ | Medium | 37 | 20 | 62 |
| 6 | Daniel O'Rourke | " 8.. | 122 | " | 38—42 | 1½—2 | Small .. | 36 | 40 | 61½ |
| 7 | Agnes | " 9.. | 123 | " | 36—40 | 2 —2¼ | Large .. | 35 | 20 | 62 |
| 8 | English Grey | " 14.. | 128 | " | 36—40 | 2 —3 | " .. | 34 | .. | 60 |
| 9 | Pride | " 7.. | 121 | Medium.. | 36—40 | 2 —2½ | Medium | 34 | .. | 63 |
| 10 | Elliot | " 12.. | 126 | " .. | 36—40 | 2 —3 | Large .. | 33 | 20 | 61 |
| 11 | Nelson | " 9.. | 123 | " .. | 32—36 | 2 —2½ | Medium | 32 | 40 | 62½ |
| 12 | Alma | " 8.. | 122 | Fair | 34—40 | 2 —3 | Large .. | 31 | 20 | 62 |
| 13 | Mackay | " 12.. | 126 | " | 35—40 | 1½—2 | Medium | 30 | 40 | 61 |
| 14 | Centennial | " 10.. | 124 | " | 36—40 | 2 —2¼ | " | 30 | 40 | 61 |
| 15 | Carleton | " 10.. | 124 | " | 35—39 | 2 —3 | Large .. | 30 | .. | 61 |
| 16 | Bruce | " 8.. | 122 | " | 34—40 | 2 —3 | " .. | 30 | .. | 62 |
| 17 | Large White Marrowfat | " 9.. | 123 | Good | 41—46 | 2 —3 | " .. | 29 | 20 | 62½ |
| 18 | Perth | " 10.. | 124 | Fair | 36—40 | 2 —2½ | Medium | 28 | 40 | 61½ |
| 19 | Gregory | " 15.. | 129 | " | 36—41 | 2 —3 | Large .. | 28 | 40 | 61 |
| 20 | Black Eyed Marrowfat | " 10.. | 124 | " | 36—42 | 2 —3 | " .. | 28 | .. | 62 |

PEASE—TEST OF VARIETIES—*Concluded.*

| Number. | Name of Variety. | Date of Ripening. | No. of days maturing. | Character of Straw. | Length of Straw. | Length of Pod. | Size of Pea. | Yield per Acre. | | Weight per bushel. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Inches. | Inches. | | Bush. | Lbs. | Lbs. |
| 21 | Prince Albert | Sept. 7.. | 121 | Medium.. | 33—38 | 2 —2¼ | Medium | 27 | 20 | 62 |
| 22 | Trilby | " 14.. | 128 | " .. | 30—35 | 1½—2 | " | 26 | 40 | 62 |
| 23 | New Potter | " 12.. | 126 | " .. | 35—38 | 2 —2¼ | " | 26 | .. | 61 |
| 24 | Victoria | " 13.. | 127 | " .. | 36—40 | 2 —3 | Large .. | 26 | .. | 60 |
| 25 | Kent | " 13.. | 127 | " .. | 30—36 | 2 —3 | " .. | 26 | .. | 61 |
| 26 | Prussian Blue | " 9.. | 123 | " .. | 35—38 | 2 —2¼ | Medium | 25 | 20 | 60½ |
| 27 | German White | " 14.. | 128 | " .. | 33—38 | 2 —2½ | " | 25 | 20 | 61 |
| 28 | Pearl | " 12.. | 126 | " .. | 35—40 | 2 —2¼ | " | 24 | 40 | 60 |
| 29 | Early Britain | " 8.. | 122 | " .. | 30—33 | 2 —2½ | Large .. | 24 | .. | 60½ |
| 30 | Wisconsin Blue | " 14.. | 128 | " .. | 38—40 | 2 —2¼ | Medium | 23 | 20 | 60 |
| 31 | Fergus | " 15.. | 129 | " .. | 32—38 | 2 —2¼ | " | 21 | 20 | 62 |
| 32 | Duke | " 8.. | 122 | " .. | 34—38 | 2 —2½ | Large . | 20 | 40 | 61 |
| 33 | Lanark | " 11.. | 127 | Poor ..... | 30—33 | 2 —2¼ | Medium | 20 | .. | 61 |
| 34 | King | " 10.. | 124 | " ..... | 23—32 | 1½—2 | Small .. | 20 | .. | 60 |
| 35 | Golden Vine | " 8.. | 122 | " ..... | 28—33 | 1½—2 | " .. | 18 | 40 | 62 |
| 36 | Prince | " 9.. | 123 | Medium.. | 32—38 | 2 —2½ | Medium | 18 | .. | 61 |
| 37 | Picton | " 8.. | 122 | " .. | 30—35 | 1½—2 | Small .. | 16 | 40 | 62 |
| 38 | White Wonder | " 8.. | 122 | Poor ..... | 24—30 | 2 —2¼ | Medium | 13 | 20 | 61 |
| 39 | Paragon | " 10.. | 124 | " ..... | 30—33 | 2 —2½ | Large .. | 13 | 20 | 61 |
| 40 | Chancellor* | | | | | | | | | |

*Failed.

## EXPERIMENTS WITH BUCKWHEAT.

These experiments were conducted on land similar to and receiving the same treatment as that on which the barley plots were grown. The ground was in mangels the previous year, and received for that crop twenty one-horse cart loads of stable manure per acre. The land was ploughed in the fall of 1902, and this spring was worked up by going over it twice with the spring-tooth and once with the smoothing harrow.

The seed was sown with the seed drill, June 12, in one-fortieth acre plots, and five varieties were included in the test. The land was also seeded down as for the other grain plots, with Timothy and clover. The yield per acre, time of ripening and character of growth are given below:—

BUCKWHEAT—TEST OF VARIETIES.

| Name of Variety. | Date of Sowing. | Date of Ripening. | No. of days Maturing. | Length of Straw. | Character of Straw. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|
| | | | | Inches. | | Bush. | Lbs. | Lbs. |
| Silver Hull | June 12.. | Sept. 3.. | 83 | 38—42 | Strong.... | 45 | 40 | 52 |
| Rye Buckwheat | " 12.. | " 4.. | 84 | 35—42 | " .... | 45 | 0 | 52 |
| Tartarian or Siberian | " 12.. | " 4.. | 84 | 34—38 | " .... | 43 | 16 | 50 |
| Japanese | " 12.. | " 3.. | 83 | 40—44 | " ... | 34 | 8 | 45 |
| Grey | 12.. | " 3.. | 83 | 38—42 | " .... | 31 | 32 | 45 |

## FIELD CROP OF GRAIN.

Six acres of field grain were sown May 16, on a light clay loam. The previous crop was turnips, for which thirty-five one-horse cart loads of stable manure had been used per acre. Previous to this manuring for the root crop this land had never received any manure. The ground was ploughed in the fall, after the root crop was removed, and in the spring was worked up with the spade, spring-tooth and smoothing harrows. The grain was sown with the seed drill and seeded down to Mammoth Red clover, 10 pounds per acre. Five acres were seeded to oats and one with barley. The following table gives the names of varieties grown, amount of land to each variety, yield per acre, by measure from the threshing machine, and the weights per bushel. The mixed grain was oats, 2 bushels; barley, 1 bushel, and pease, 1 peck, mixed together and sown at the rate of 2½ bushels per acre:—

| — | Weight per Measured Bushel. | Yield per Acre. | |
|---|---|---|---|
| | Lbs. | Bush. | Lbs. |
| 1¼ acre, Sensation oats | 37 | 70 | 14 |
| 1¼ " Cream Egyptian oats | 39 | 65 | 0 |
| 1¼ " Black Tartarian | 36 | 62 | 12 |
| 1¼ " Canadian Thorpe barley | 49 | 45 | 0 |
| 1¼ " mixed oats, barley and pease | 43 | 62 | 12 |

## FIELD CROPS OF MIXED GRAIN.

Eleven acres of mixed grain were grown on a clay loam soil. The previous crop was clover and Timothy, which was ploughed in the fall, with the aftermath turned under, which was light. The ground was manured in 1900 for a root crop, followed by grain in 1901, and clover in 1902. The soil was worked up into a good tilth and the grain sown with the seed drill. Six acres was sown May 5, with a mixture of the following proportions: Oats, Rosedale, 2 bushels; barley, Surprise, 1 bushel, and Golden Vine pease, 1 peck, sown at the rate of 2½ bushels per acre. This was harvested August 29. Five acres was sown May 11, with Sensation oats, 2 bushels; Canadian Thorpe barley, 1 bushel; Golden Vine pease, 1 peck, mixed together and sown at the rate of 2½ bushels per acre. This was harvested September 3. The following yields per acre of measured bushels from the threshing machine, weighing 41 pounds per bushel were obtained: 6 acres Rosedale oats, Surprise barley, Golden Vine pease mixed, yielded 65 bushels per acre. 5 acres Sensation oats, Canadian Thorpe barley and Golden Vine pease mixed, yielded 72 bushels per acre.

## FIELD CROP OF OATS ON MARSH LAND.

Five acres of oats were sown May 8, on marsh land that had been ploughed the previous fall. This was seeded at the time the grain was sown, with clover and Timothy. This made a fairly good growth the early part of the season, but owing to the exceptionally high tides in August, which broke the dykes and overflowed the land, the grain crop was almost a total loss, and the young take of clover and timothy was completely destroyed.

## FIELD CROPS OF BUCKWHEAT.

Four and one-half acres of Silverhull buckwheat was sown on land that had been brought into cultivation for the first time last season. The ground was exceptionally poor, 250 pounds of seed was sown June 24, and the crop harvested September 15, yielding 23 bushels 16 pounds per acre.

One-half acre of buckwheat of the Grey variety was grown on clay loam in a fair state of fertility, it having received manure at the rate of twenty one-horse cart loads per acre, the previous year, when a crop of roots was grown. This land was ploughed in the fall of 1902. It was sown June 19, and harvested September 10, and yielded at the rate of 35 bushels per acre.

## EXPERIMENTS WITH INDIAN CORN.

Twenty-three varieties of Indian corn were planted June 2. The soil was a light clay loam and had been manured for roots in 1900, followed by grain in 1901 and clover in 1902. The land was manured in the fall of 1902 with twenty-five one-horse cart loads of stable manure per acre. This was not ploughed, however, until the following spring just before planting. The object in letting the land go without ploughing to seeding time was to get the benefit from the spring growth of clover turned under, but owing to the exceptionally dry spring the growth was very light. After ploughing, the ground was worked up by going over it once each with the spade, springtooth and smoothing harrows. No commercial fertilizer was used on these plots.

The corn was planted in hills and rows. One set of plots was in hills 3 feet apart each way, and a duplicate lot of plots in rows 3 feet apart. The seed sown in rows was dropped in shallow drills and covered with the hoe, and the plants were thinned to 6 inches apart in the rows. In the hills from three to five plants were left in each hill. The yield per acre is calculated from the weight obtained from two rows each 66 feet long. The crop was harvested October 6, and the following yields obtained:—

CORN—TEST OF VARIETIES.

| Number. | Name of Variety. | Height. | When Tasselled. | In Silk. | Condition when Cut. | Weight per Acre grown in Rows. | | Weight per Acre grown in Hills. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Inches. | | | | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Selected Leaming | 95 | Sept. 4 | Sept. 25 | Watery | 18 | 850 | 15 | 250 |
| 2 | Giant Prolific Ensilage | 97 | " 4 | | Tasselling | 17 | 1,750 | 17 | 1,530 |
| 3 | Red Cob Ensilage | 96 | " 4 | | " | 17 | 870 | 15 | 800 |
| 4 | Early Mastodon | 93 | " 5 | Sept. 15 | Watery | 17 | 650 | 17 | 320 |
| 5 | Eureka | 97 | " 5 | | Tasselling | 17 | 320 | 16 | 1,550 |
| 6 | Superior Fodder | 96 | " 5 | | " | 17 | 100 | 16 | 1,000 |
| 7 | Thoroughbred White Flint | 92 | " 5 | | " | 16 | 1,330 | 16 | 450 |
| 8 | Longfellow | 90 | Aug. 25 | Sept. 2 | Glazed | 15 | 1,570 | 14 | 950 |
| 9 | Sanford | 84 | " 25 | " 3 | Soft Glazed | 15 | 1,350 | 16 | 1,770 |
| 10 | Salzer's All Gold | 93 | " 25 | | Tasselling | 15 | 800 | 12 | 750 |
| 11 | Compton's Early | 86 | " 25 | Sept. 2 | Glazed | 14 | 1,370 | 14 | 1,150 |
| 12 | Mammoth Cuban | 95 | Sept. 5 | " 15 | Watery | 14 | 1,150 | 15 | 250 |
| 13 | Champion White Pearl | 93 | " 5 | " 15 | " | 14 | 600 | 14 | 1,370 |
| 14 | King Philip | 81 | Aug. 28 | " 8 | " | 14 | 600 | 13 | 1,500 |
| 15 | Early Butler | 92 | " 28 | | Tasselling | 14 | 270 | 14 | 820 |
| 16 | King of the Earliest | 87 | Sept. 1 | Sept. 15 | Watery | 14 | 50 | 15 | 800 |
| 17 | White Cap Yellow Dent | 98 | Aug. 29 | " 15 | " | 13 | 1,500 | 13 | 950 |
| 18 | Angel of Midnight | 85 | " 25 | " 3 | Glazed | 13 | 950 | 12 | 1,850 |
| 19 | Pride of the North | 94 | Sept. 5 | " 15 | Watery | 12 | 530 | 12 | 1,850 |
| 20 | North Dakota White | 83 | Aug. 27 | " 4 | Soft Glazed | 11 | 1,100 | 11 | 550 |
| 21 | Mammoth Eight-rowed Flint | 84 | Sept. 1 | " 15 | Watery | 11 | 1,100 | 11 | |
| 22 | Cloud's Early Yellow | 90 | " 3 | " 17 | " | 11 | 550 | 14 | 600 |
| 23 | Evergreen Sugar | 87 | " 6 | " 18 | " | 11 | | 10 | 1,670 |

Six acres mixed grain. Yield per acre 72 measured bushels.

### CORN SOWN IN ROWS AT DIFFERENT DISTANCES APART.

The experiment of growing corn planted in rows at different distances apart was again continued this year. The varieties of corn sown were Champion White Pearl, Selected Leaming and Longfellow. The land on which these were grown was similar to and received the same treatment in every respect as that on which the other corn plots were grown.

The seed was sown June 2, in rows 21, 28, 35 and 42 inches apart. Each plot was one-fortieth acre. The crop was harvested October 6, and the following yields per acre obtained:—

| Name of Variety. | Distance Apart. | Yield Per Acre. | |
|---|---|---|---|
| | in. | Tons. | Lbs. |
| Selected Leaming | 42 | 13 | 1,840 |
| " " | 35 | 15 | 910 |
| " " | 28 | 15 | 720 |
| " " | 21 | 14 | 905 |
| Champion White Pearl | 42 | 15 | 1,720 |
| " " | 35 | 17 | 9·0 |
| " " | 28 | 18 | 1,620 |
| " " | 21 | 15 | 725 |
| Longfellow | 42 | 12 | 1,800 |
| " | 35 | 15 | 1,960 |
| " | 28 | 14 | 4:2 |
| " | 21 | 14 | 20 |

## FIELD CROPS OF CORN.

### FERTILIZER EXPERIMENTS.

One acre of corn was planted in rows 3 feet apart on a light clay sandy loam. The ground was in clover in 1902. Stable manure at the rate of twenty-five one-horse cart loads per acre was spread on the sod in the fall, and this was ploughed under just before planting. The ground was worked up into good tilth with the spade, spring-tooth and smoothing harrows, and the seed was sown with the seed drill June 1. To one-third of the acre was added complete fertilizer at the rate of 500 pounds per acre, and one-third at the rate of 250 pounds per acre, and the remainder left without commercial fertilizer. The fertilizer was scattered broadcast along the rows after the seed was planted, and harrowed in with the smoothing harrow. The crop was harvested October 3 and the following yields per acre obtained. The variety Longfellow was used.

| | Tons. | Lbs. |
|---|---|---|
| ⅓ acre plot, manure and fertilizer, 500 pounds per acre... | 17 | 1,700 |
| ⅓ " " " 250 " .... | 15 | 1,500 |
| ⅓ " manure only.......... | 14 | 700 |

Three acres of corn were grown on a light clay loam soil that had been previously in oats, with which Mammoth Red clover at the rate of 10 pounds per acre was sown and ploughed under in the fall of 1902. Up to this time this field had not received any stable manure. The ground was worked up in the spring with the spade and spring-tooth harrows, and stable manure at the rate of 30 one-horse cart loads per acre spread broadcast and ploughed under. This was worked up to a good tilth, and the seed sown with the seed drill on June 10, in rows 3 feet apart. To one-third of each acre was added complete fertilizer at the rate of 500 pounds per acre, and one-third 250 pounds per acre, and the remainder of the acre was left without commercial fertilizer. The commercial fertilizer was scattered broadcast along the rows after planting, and harrowed in with the smoothing harrow. One acre was planted with Compton's Early, one with Angel of Midnight and one with Dakota White corn. The following yields were obtained from weighing the crop from each one-third acre. It was harvested October 5 to 8:—

FIELD CROP OF CORN—FERTILIZER EXPERIMENT.

Sown June 10. Harvested October 5 to 8.

| Name of Variety. | Yield Per Acre. | |
|---|---|---|
| | Tons. | Lbs. |
| ⅓ acre Compton's Early, manure and fertilizer, 500 lbs. per acre | 16 | 1,500 |
| ⅓ " " " " 250 " " | 14 | 1,200 |
| ⅓ " " " only | 12 | 540 |
| ⅓ " Angel of Midnight, manure and fertilizer, 500 lbs. per acre | 21 | 0 |
| ⅓ " " " " 250 " " | 18 | 1,000 |
| ⅓ " " " only | 15 | 1,500 |
| ⅓ " Dakota White, manure and fertilizer, 500 lbs. per acre | 17 | 500 |
| ⅓ " " " " 250 " " | 15 | 1,350 |
| ⅓ " " " only | 12 | 1,140 |

## EXPERIMENTS WITH TURNIPS.

These plots were sown May 15 and a duplicate set planted May 29. Twenty-one varieties were included in the test. The crops on both sets of plots were pulled October 27, and the yields per acre have been calculated from the yield per plot of two rows, each 66 feet long. The ground was a light clay loam and was previously in clover. The land was manured with 15 one-horse cart loads of stable manure per acre on the sod in the fall of 1902 and ploughed under. In the spring this was worked up with the spade harrow and 15 one-horse cart loads of stable manure was again applied, which was ploughed under and the ground harrowed with the spring-tooth and smoothing harrows. Two hundred pounds of complete fertilizer and 200 lbs. of bone meal per acre were sown broadcast and harrowed in with the smoothing harrow. The ground was run into rows 24 inches apart. These rows were raked off and the plots planted with the Planet Jr. No. 5 seed drill. The plants were thinned to about one foot apart in the rows, and following yields per acre obtained:—

TURNIPS—TEST OF VARIETIES.

| Number | Name of Variety. | Yield per Acre. 1st Plot. | | Yield per Acre. 1st Plot. | | Yield per Acre. 2nd Plot. | | Yield per Acre. 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Perfection Swede | 50 | 320 | 1,672 | 0 | 43 | 625 | 1,443 | 45 |
| 2 | Magnum Bonum | 49 | 1.000 | 1,650 | 0 | 41 | 1,390 | 1,391 | 30 |
| 3 | Halewood's Bronze Top | 48 | 1,845 | 1,630 | 45 | 34 | 1,465 | 1,167 | 45 |
| 4 | Elephant's Master | 48 | 30 | 1,600 | 30 | 37 | 910 | 1.248 | 30 |
| 5 | Selected Purple Top | 47 | 1,370 | 1,589 | 30 | 40 | 955 | 1,349 | 15 |
| 6 | Mammoth Clyde | 47 | 1,040 | 1,584 | 0 | 38 | 1,055 | 1,284 | 15 |
| 7 | Kangaroo | 47 | 875 | 1,581 | 15 | 34 | 1,795 | 1,163 | 15 |
| 8 | Emperor | 47 | 710 | 1,578 | 30 | 40 | 25 | 1,333 | 45 |
| 9 | New Century | 47 | 50 | 1,567 | 30 | 38 | 725 | 1,278 | 45 |
| 10 | Bangholm Selected | 46 | 235 | 1,537 | 15 | 35 | 455 | 1,174 | 15 |
| 11 | Jumbo | 44 | 1,925 | 1,498 | 45 | 37 | 745 | 1,245 | 45 |
| 12 | Good Luck | 44 | 1,760 | 1,496 | 0 | 41 | 500 | 1,375 | 0 |
| 13 | Skirvings | 44 | 605 | 1,476 | 45 | 38 | 1,550 | 1,292 | 30 |
| 14 | Drummond's Purple Top | 43 | 1.120 | 1,452 | 0 | 35 | 125 | 1,168 | 45 |
| 15 | Imperial Swede | 43 | 955 | 1,449 | 15 | 37 | 85 | 1,234 | 45 |
| 16 | Hall's Westbury | 41 | 1,820 | 1,397 | 0 | 37 | 1,735 | 1,262 | 15 |
| 17 | Hartley's Bronze | 41 | 1,490 | 1,391 | 30 | 35 | 455 | 1,174 | 15 |
| 18 | Shamrock Purple Top | 41 | 1,325 | 1,388 | 45 | 35 | 1,115 | 1,185 | 15 |
| 19 | East Lothian | 41 | 665 | 1.377 | 45 | 36 | 435 | 1,207 | 15 |
| 20 | Sutton's Champion | 39 | 1,530 | 1,325 | 30 | 38 | 1.550 | 1,292 | 30 |
| 21 | Carter's Elephant | 39 | 1,365 | 1,322 | 45 | 32 | 680 | 1,078 | 0 |

### FIELD CROPS OF TURNIPS—FERTILIZER EXPERIMENTS.

Five acres of turnips were grown on land that was of a light clay-loam character. The year previous a crop of pease was ploughed under, green. This land was exceptionally poor and had not had any stable manure previously. In the spring of 1903 the land was worked up with the spade and spring-tooth harrows, and 35 one-horse cart loads of stable manure per acre spread broadcast and ploughed under. Five varieties of turnips were sown, one acre to each sort. To one-third of each acre was added complete fertilizer at the rate of 500 lbs. per acre; to another third 250 lbs. complete fertilizer per acre, and on the remaining third no commercial fertilizer was used. The fertilizer was sown broadcast and harrowed in with the smoothing harrow before the rows were run up. The rows were made 24 inches apart. The yield from each ⅓ acre was weighed and the following crops per acre obtained :—

### FIELD CROP OF TURNIPS—FERTILIZER EXPERIMENT.

Sown June 6. Harvested October 27.

| Name of Variety and Size of Plot. | Yield per Acre. | | Yield per Acre. | |
|---|---|---|---|---|
| | Tons. | Lbs. | Bush. | Lbs. |
| *Sutton's Champion.* | | | | |
| ⅓ acre—Manure and fertilizer, 500 lbs. per acre | 30 | 1,605 | 1,026 | 45 |
| ⅓ " " " 250 " | 27 | 1,020 | 917 | .. |
| ⅓ " " only | 28 | 425 | 940 | 25 |
| *Kangaroo.* | | | | |
| ⅓ acre—Manure and fertilizer, 500 lbs. per acre | 30 | 330 | 1,005 | 30 |
| ⅓ " " " 250 " | 28 | 1,870 | 964 | 30 |
| ⅓ " " only | 27 | 1,815 | 930 | 15 |
| *Hartley's Bronze.* | | | | |
| ⅓ acre—Manure and fertilizer, 500 lbs. per acre | 29 | 1,025 | 983 | 45 |
| ⅓ " " " 250 " | 28 | 325 | 938 | 45 |
| ⅓ " " only | 27 | 1,755 | 929 | 15 |
| *Elephant Swede.* | | | | |
| ⅓ acre—Manure and fertilizer, 500 lbs. per acre | 27 | 1,350 | 922 | 30 |
| ⅓ " " " 250 " | 26 | 395 | 873 | 15 |
| ⅓ " " only | 24 | .... | 800 | .. |
| *Rennie's Prize Purple Top.* | | | | |
| ⅓ acre—Manure and fertilizer, 500 lbs. per acre | 27 | 330 | 905 | 30 |
| ⅓ " " " 250 " | 26 | 1,610 | 893 | 30 |
| ⅓ " " only | 26 | 1,880 | 898 | .. |

## EXPERIMENTS WITH MANGELS.

Sixteen varieties of mangels were sown May 15, and a duplicate set sown May 29, two weeks later. Each plot was two rows, each 66 feet long. The land on which these were grown was adjoining the turnip plots and received the same treatment in every respect. The rows were 24 inches apart. They were raked off and the seed sown in bunches one foot apart with the Planet Jr. seed drill No. 5. The crop of both sets of plots was harvested October 21, and the following yields were obtained. On account of the extremely dry weather at planting time the seed germinated very irregularly and quite a number of the plants were destroyed by the cutworm when from 3 to 5 inches high :—

### MANGELS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre, 1st Plot. | | Yield per Acre, 1st Plot. | | Yield per Acre, 2nd Plot. | | Yield per Acre, 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Mammoth Yellow Intermediate | 46 | 1,225 | 1,554 | 25 | 37 | 745 | 1,245 | 45 |
| 2 | Lion Yellow Intermediate | 46 | 235 | 1,537 | 15 | 41 | 5 | 1,366 | 45 |
| 3 | Giant Yellow Intermediate | 45 | 1,575 | 1,526 | 15 | 36 | 600 | 1,210 | .. |
| 4 | Giant Yellow Globe | 45 | 585 | 1,509 | 45 | 36 | 1,425 | 1,223 | 45 |
| 5 | Prize Mammoth Long Red | 45 | 255 | 1,504 | 15 | 37 | 1,240 | 1,254 | .. |
| 6 | Selected Yellow Globe | 45 | 90 | 1,501 | 30 | 35 | 475 | 1,174 | 35 |
| 7 | Prize Winner Yellow Globe | 43 | 1,450 | 1,457 | 30 | 37 | 415 | 1,240 | 15 |
| 8 | Selected Mammoth Long Red | 43 | 1,120 | 1,452 | .. | 39 | 1,365 | 1,322 | 45 |
| 9 | Leviathan Long Red | 42 | 1,800 | 1,430 | .. | 35 | 125 | 1,168 | 45 |
| 10 | Triumph Yellow Globe | 41 | 1,325 | 1,388 | 45 | 30 | 225 | 1,003 | 45 |
| 11 | Half Long Sugar Rosy | 41 | 170 | 1,369 | 30 | 32 | 185 | 1,069 | 45 |
| 12 | Mammoth Long Red | 41 | 5 | 1,366 | 45 | 36 | 1,755 | 1,229 | 15 |
| 13 | Half Long Sugar White | 40 | 1,675 | 1,361 | 15 | 30 | 1,710 | 1,028 | 30 |
| 14 | Yellow Intermediate | 40 | 850 | 1,347 | 30 | 32 | 1,175 | 1,086 | 15 |
| 15 | Giant Sugar Mangel | 33 | 495 | 1,108 | 15 | 25 | 985 | 849 | 45 |
| 16 | Gate Post | 32 | 1,670 | 1,094 | 30 | 22 | 550 | 742 | 30 |

### FIELD CROP OF MANGELS —TEST OF VARIETIES.

The land on which these were grown was previously in clover, and was ploughed in the fall of 1902. The soil was a light clay loam. The ground was worked up with the spade and spring-tooth harrows in the spring of 1903, and stable manure at the rate of twenty-five one-horse cart loads per acre spread broadcast and ploughed under. This was worked up to a good tilth and 250 lbs. of complete fertilizer per acre sown broadcast and harrowed in with the smoothing harrow before the rows were run. The rows were made with the double mould-board plough 24 inches apart. The rows were raked off by hand and the mangel seed at the rate of 8 lbs. per acre, sown in bunches one foot apart with the hand Planet Jr. seed drill No. 5. Three varieties of mangels were sown, one half acre each. Owing to the continued dry spring the seed germinated slowly and irregularly. The cutworms did considerable damage to the young plants, leaving a number of blanks. The entire yield of each variety was weighed and the following crops per acre obtained. The seed was sown May 16, harvested October 19 and 20.

### FIELD CROP OF MANGELS—TEST OF VARIETIES.

| Manure and fertilizer 250 lbs. per acre. | Yield per acre. | | | |
|---|---|---|---|---|
| | Tons. | lbs. | Bush. | lbs. |
| Mammoth Long Red | 21 | 936 | 715 | 36 |
| Giant Yellow Half Long | 20 | 1,100 | 685 | .. |
| Giant Yellow Globe | 19 | 1,300 | 655 | .. |

### FIELD CROP OF MANGELS—FERTILIZER EXPERIMENTS.

The land on which these were grown was a light clay loam. The previous crop was oats, with which 10 lbs. Mammoth Red Clover was sown per acre, and what growth it made was ploughed under in the fall of 1902. This was worked up in the spring with the spade and spring-tooth harrows, and 30 one-horse cart loads of stable manure per acre spread broadcast and ploughed under. The land was then worked up into good tilth. Three varieties were grown in ¾ acre lots. One-third of each lot had complete fertilizer added at the rate of 500 lbs. per acre sown broadcast ; one-third complete fertilizer at the rate of 250 lbs. per acre, and the remaining third no commercial fertilizer. The fertilizer was sown broadcast and harrowed in with the smoothing harrow, before the rows were run 24 inches apart. The seed germinated slowly and the plants came up irregularly, due to the dry weather. The seed was sown May 26 and harvested October 19 and 20. The following yields per acre were obtained.

FIELD CROP OF MANGELS—FERTILIZER EXPERIMENT.

| — | Yield per Acre | | Yield per Acre | |
|---|---|---|---|---|
| | Tons. | lbs. | Bush. | lbs. |
| MAMMOTH LONG RED. | | | | |
| ⅓ acre—Manure and fertilizer, 500 lbs. per acre | 25 | 250 | 837 | 30 |
| ⅓ " " " 250 " | 24 | 350 | 805 | 50 |
| ⅓ " " only | 23 | 1,750 | 795 | 50 |
| GIANT YELLOW HALF LONG. | | | | |
| ⅓ acre—Manure and fertilizer, 500 lbs. per acre | 28 | 1,250 | 954 | 10 |
| ⅓ " " " 250 " | 28 | 250 | 937 | 30 |
| ⅓ " " only | 26 | .... | 866 | 40 |
| GIANT YELLOW GLOBE. | | | | |
| ⅓ acre—Manure and fertilizer, 500 lbs. per acre | 19 | 1,350 | 656 | 10 |
| ⅓ " " " 250 " | 18 | 450 | 607 | 10 |
| ⅓ " " only | 21 | 100 | 701 | 40 |

## EXPERIMENTS WITH CARROTS.

The plots chosen for this test were similar in every respect and received the same treatment as the turnip and mangel plots. Eleven varieties were sown. One set of plots on May 15 and a duplicate set on May 29. The rows were 24 inches apart. They were raked off by hand and the seed was sown with the Planet Jr. No. 5 seed drill. Each plot was two rows, 66 feet long. They were harvested October 27 and gave the following yields:—

CARROTS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. 1st Plot. | | Yield per Acre. 1st Plot. | | Yield per Acre. 2nd Plot. | | Yield per Acre. 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Ontario Champion | 30 | 225 | 1003 | 25 | 22 | 1,375 | 756 | 15 |
| 2 | Giant White Vosges | 29 | 905 | 981 | 45 | 19 | 1,660 | 660 | .. |
| 3 | Mammoth White Intermediate | 27 | 615 | 919 | 15 | 24 | 675 | 811 | 15 |
| 4 | New White Intermediate | 24 | 675 | 811 | 15 | 22 | 880 | 748 | .. |
| 5 | Half Long Chantenay | 23 | 200 | 770 | .. | 18 | 300 | 605 | .. |
| 6 | Long Yellow Stump rooted | 22 | 880 | 748 | .. | 21 | 1,375 | 723 | 15 |
| 7 | Improved Short White | 20 | 1,580 | 693 | .. | 20 | 920 | 682 | .. |
| 8 | Early Gem | 19 | 1105 | 651 | 45 | 19 | 445 | 640 | 45 |
| 9 | Half Long White | 19 | 415 | 640 | 15 | 18 | 1,620 | 627 | .. |
| 10 | White Belgian | 18 | 1,950 | 632 | 30 | 17 | 155 | 569 | 15 |
| 11 | Carter's Orange Giant | 17 | 650 | 577 | 30 | 15 | 1,350 | 522 | 30 |

## EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were planted in plots consisting of two rows each 66 feet long, on May 15, and duplicate ones on May 29. These were on land similar in every respect and receiving the same treatment as the turnip, mangel and carrot plots. The seed was sown in rows 24 inches apart. The rows were raked off and the seed sown in bunches one foot apart, with the Planet Jr. No. 5 seed drill. The crop was gathered October 22 and the following yield obtained:—

SUGAR BEETS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. 1st Plot. | | Yield per Acre. 1st Plot. | | Yield per Acre. 2nd Plot. | | Yield per Acre. 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Royal Giant | 37 | 415 | 1,204 | 15 | 30 | 399 | 1,006 | 30 |
| 2 | Danish Red Top | 31 | 40 | 1,034 | 0 | 21 | 1,395 | 723 | 15 |
| 3 | Red Top Sugar | 29 | 575 | 976 | 15 | 19 | 445 | 640 | 45 |
| 4 | Vilmorin's Improved | 28 | 925 | 948 | 45 | 24 | 675 | 811 | 15 |
| 5 | Improved Imperial | 28 | 595 | 943 | 15 | 18 | 1,620 | 627 | 0 |
| 6 | Danish Improved | 28 | 265 | 937 | 45 | 22 | 1,375 | 756 | 15 |
| 7 | Wanzleben | 24 | 1,005 | 816 | 45 | 20 | 425 | 673 | 45 |
| 8 | French 'Very Rich' | 21 | 75 | 701 | 15 | 17 | 650 | 577 | 30 |

## EXPERIMENTS WITH POTATOES.

The land on which these were grown was clay loam, having been in timothy and clover the year before. The ground was manured with 20 one-horse cart loads of stable manure per acre in the fall of 1902, and ploughed under. This was worked up in the spring following, with the spade, spring-tooth and smoothing harrows and ploughed again. Rows were run 30 inches apart and from 3 to 5 inches deep, and potato fertilizer at the rate of 300 lbs. per acre sown in the rows before the planting was begun. The sets were planted May 22 one foot apart in the rows and covered with the plough. The tubers were cut so as to have from two to three eyes in each piece. The drills were harrowed down once before the plants were above the ground, to destroy weeds, and again drilled up in a few days and kept loose with a cultivator until the vines were quite large. An unusual number of sets rotted in the ground, making the plots somewhat irregular. The plots were sprayed with bordeaux mixture and paris green combined July 21, August 8, and August 28. The potato blight did not strike these plots, which kept green throughout the whole season, while considerable damage was done by late blight in surrounding districts.

Fifty-five varieties were included in this test. Each plot consisted of two rows, each 66 feet long. The crop was harvested September 25, and the following yields obtained:—

POTATOES—TEST OF VARIETIES.

| Number. | Name of Variety. | Quality. | Total Yield per Acre. | | Yield per Acre Marketable. | | Yield per Acre Unmarketable. | | Description of Variety, Form and Colour. |
|---|---|---|---|---|---|---|---|---|---|
| | | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | |
| 1 | Pearce | Medium | 605 | 0 | 572 | 0 | 33 | 0 | Long, pink and white. |
| 2 | Vanier | " | 550 | 0 | 451 | 0 | 99 | 0 | Long, dark pink. |
| 3 | Vick's Extra Early | Good | 534 | 36 | 451 | 0 | 83 | 36 | Oval, pink. |
| 4 | Seedling No. 7 | Medium | 528 | 0 | 448 | 48 | 79 | 12 | " |
| 4 | McIntyre | " | 517 | 0 | 462 | 0 | 55 | 0 | Long, blue and white. |
| 6 | Enormous | " | 506 | 0 | 446 | 36 | 59 | 24 | Oblong, white. |
| 7 | Rochester Rose | " | 495 | 0 | 444 | 24 | 50 | 36 | Oblong, pink. |
| 8 | Clay Rose | " | 492 | 48 | 444 | 36 | 46 | 12 | Round, pink. |
| 9 | Everett | Good | 433 | 24 | 356 | 24 | 77 | 0 | Flat, round pink. |
| 10 | Troy Seedling | Medium | 429 | 0 | 319 | 0 | 110 | 0 | Round, white. |
| 11 | Penn Manor | " | 418 | 0 | 297 | 0 | 121 | 0 | Long, pink. |
| 12 | Burnaby Seedling | " | 411 | 24 | 352 | 0 | 59 | 24 | Round, pink. |
| 13 | Late Puritan | " | 407 | 0 | 374 | 0 | 33 | 0 | Long, white. |
| 14 | Early Envoy | " | 407 | 0 | 352 | 0 | 55 | 0 | Oblong, pink. |
| 15 | Swiss Snowflake | " | 404 | 48 | 360 | 48 | 44 | 0 | Round, white. |
| 16 | Rose No. 9 | Good | 378 | 24 | 341 | 0 | 37 | 24 | Oblong, pink. |
| 17 | Maule's Thoroughbred | Medium | 374 | 0 | 330 | 0 | 44 | 0 | Long, pink. |
| 18 | Early Puritan | Good | 367 | 24 | 314 | 36 | 52 | 48 | Long, pink and white. |
| 19 | Early Norther | " | 365 | 12 | 316 | 48 | 48 | 24 | Long, white. |
| 20 | I. X. L. | Medium | 363 | 0 | 314 | 36 | 48 | 24 | Long, pink and white. |
| 21 | Irish Cobbler | Good | 358 | 36 | 297 | 0 | 61 | 36 | Round, white. |
| 22 | Bovee | " | 347 | 36 | 297 | 0 | 50 | 36 | Oblong, pink and white. |
| 23 | State of Maine | " | 345 | 24 | 297 | 0 | 48 | 24 | Round, flat and white. |
| 24 | Sharpe's Seedling | Medium | 341 | 0 | 301 | 24 | 39 | 36 | Long, white. |
| 25 | Up to Date | " | 336 | 36 | 297 | 0 | 39 | 36 | Long, flat, white. |
| 26 | Delaware | Good | 330 | 0 | 286 | 0 | 44 | 0 | Round, flat, white. |
| 27 | Pingree | Medium | 325 | 36 | 272 | 48 | 52 | 48 | Oblong, white. |
| 28 | Empire State | Good | 314 | 36 | 268 | 24 | 46 | 12 | Long, white. |
| 29 | Canadian Beauty | " | 312 | 24 | 279 | 24 | 33 | 0 | Long, round, pink and white. |
| 30 | Early Andes | " | 310 | 12 | 250 | 48 | 59 | 24 | Oblong, pink. |
| 31 | Green Mountain | " | 308 | 0 | 257 | 24 | 50 | 36 | Round, white. |
| 32 | Uncle Sam | " | 308 | 0 | 275 | 0 | 33 | 0 | " |
| 33 | Sabean's Elephant | Medium | 301 | 24 | 268 | 24 | 33 | 0 | Long, round, white. |
| 34 | Holborn Abundance | " | 297 | 0 | 253 | 0 | 44 | 0 | Round, white. |
| 35 | Irish Daisy | " | 294 | 48 | 242 | 0 | 52 | 48 | Oblong white. |
| 36 | Brown's Rot Proof | " | 286 | 0 | 220 | 0 | 66 | 0 | " |
| 37 | Money Maker | Good | 272 | 48 | 220 | 0 | 52 | 48 | Long, white. |
| 38 | Carman No. 3 | " | 270 | 36 | 237 | 36 | 33 | 0 | Round, flat, white. |
| 39 | Early White Prize | " | 264 | 0 | 231 | 0 | 33 | 0 | Long, white. |
| 40 | Dreer's Standard | " | 259 | 36 | 220 | 0 | 39 | 36 | Oblong, white. |
| 41 | Early Rose | " | 253 | 0 | 209 | 0 | 44 | 0 | Long, pink. |
| 42 | Prolific Rose | " | 250 | 48 | 213 | 24 | 37 | 24 | " |
| 43 | American Wonder | " | 248 | 36 | 213 | 24 | 35 | 12 | Long, white. |
| 44 | Reeve's Rose | " | 242 | 0 | 187 | 0 | 55 | 0 | Long, pink. |
| 45 | American Giant | Medium | 235 | 24 | 191 | 24 | 44 | 0 | " |
| 46 | Cambridge Russet | " | 231 | 0 | 198 | 0 | 33 | 0 | Long, white. |
| 47 | Early St. George | Good | 231 | 0 | 198 | 0 | 33 | 0 | Long, pink. |
| 48 | Early Sunrise | " | 228 | 48 | 182 | 36 | 46 | 12 | " |
| 49 | Country Gentleman | " | 228 | 48 | 191 | 24 | 37 | 24 | Long, pink and white. |
| 50 | Carman No. 1 | " | 226 | 36 | 191 | 24 | 35 | 12 | Round, flat and white. |
| 51 | General Gordon | Medium | 222 | 12 | 171 | 36 | 50 | 36 | Long, pink. |
| 52 | Lee's Favourite | " | 222 | 12 | 162 | 48 | 59 | 24 | Long, pink and white. |
| 53 | Burpee's Extra Early | Good | 202 | 24 | 165 | 0 | 37 | 24 | Long, round, pink and white. |
| 54 | Early Michigan | " | 202 | 24 | 160 | 36 | 41 | 48 | Oblong, white. |
| 55 | Rawdon Rose | " | 198 | 0 | 169 | 24 | 28 | 36 | Oblong, pink and white. |

POTATOES—NOT IN UNIFORM TEST PLOTS.

| Number. | Name of Variety. | Total Yield per Acre. | | Yield per Acre Marketable. | | Yield per Acre Unmarketable. | | Date of Planting. | Date of Digging. | Form and Colour. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | | | |
| 1 | Peachblow | 539 | 0 | 495 | 0 | 44 | 0 | May 22. | Sept. 25. | Oval, light red. |
| 2 | Shenango | 446 | 36 | 396 | 0 | 50 | 36 | " 22. | " 25. | Long, blue and white. |
| 3 | Garnet Chili | 440 | 0 | 385 | 0 | 55 | 0 | " 22. | " 25. | Round, light red. |
| 4 | Thorburn | 429 | 0 | 330 | 0 | 99 | 0 | " 22. | " 25. | Long, pink and white. |
| 5 | Dark Blue | 426 | 48 | 391 | 36 | 35 | 12 | " 22. | " 25. | Round, flat, blue. |
| 6 | Rural No. 2 | 407 | 0 | 374 | 0 | 33 | 0 | " 22. | " 25. | Round, white. |
| 7 | Quaker City | 352 | 0 | 308 | 0 | 44 | 0 | " 22. | " 25. | Round, white. |
| 8 | Sir Walter Raleigh | 330 | 0 | 297 | 0 | 33 | 0 | " 22. | " 25. | Round, flat, white. |
| 9 | White Beauty | 259 | 36 | 209 | 0 | 50 | 36 | " 22. | " 25. | Long, pink and white. |

## FLAX—TEST OF VARIETIES.

Two varieties of flax were grown on a clay loam soil which was in mangels the previous year. The land was ploughed in the fall of 1902 and worked up to a good tilth in the spring of 1903, and the seed sown with the seed drill at the rate of 30 lbs. per acre June 12. The plots were one-twentieth acre each and were harvested September 3. The following yields were obtained :—

| | Weight per Bushel. | Yield per Acre. |
|---|---|---|
| | Lbs. | Bush. |
| Riga Flax | 50 | 22 |
| White Russian Flax | 50 | 24 |

## EXPERIMENTS WITH SOJA BEANS.

The soil selected for these plots was a heavy clay loam. The previous crop was oats and vetches for green feed, the land having been manured for that crop in the spring of 1902 with 25 one-horse cart loads of stable manure per acre. It was ploughed in the fall of 1902 and this spring was worked up by ploughing and harrowing with the spring-tooth and smoothing harrows. The beans were sown with the Wisner seed drill June 13 in rows 21, 28 and 35 inches apart. The crop was cut and weighed October 6.

The object of this experiment is to obtain information as to the value of this plant as a forage crop, and to ascertain the yields per acre from seed sown in rows at different distances apart. The plots were one-fortieth acre each. The crop made only fair growth and did not mature well.

| | Yield per Acre. | |
|---|---|---|
| | Tons. | Lbs. |
| Soja Beans, 21 inches apart | 6 | 200 |
| " 28 " | 5 | 1,600 |
| " 35 " | 5 | 1,000 |

## EXPERIMENTS WITH HORSE BEANS.

The land on which these were grown was similar to that used for the Soja Beans, and received the same treatment. The beans were sown with the seed drill June 13 in rows 21, 28 and 35 inches apart. The variety 'Tick' was used. Each plot was one-fortieth acre. The plants, on account of the cool summer, did not mature as well as usual. The following yields per acre were obtained from the crop harvested October 6:—

| | Yield per Acre.<br>Tons. | <br>Lbs. |
|---|---|---|
| Horse Beans, 21 inches apart | 15 | 800 |
| " 28 " | 14 | 680 |
| " 35 " | 12 | 1,400 |

## CLOVER EXPERIMENTS.

The object in view in these experiments was to show the value of growing clover with grain crops, and determine the gain, if any, from, ploughing the clover of one year's growth under for future crops. Another object sought this year was to find out whether the yield of grain would be affected by the clover growing with it. On account of this season being an exceptionally dry one, the growth of clover was less than usual, and it may be well to repeat these experiments next year, with the same object in view. The Mammoth Red Clover was sown with the grain at seeding time at the rate of 10 lbs. per acre, by means of a seeding attachment to the grain seed drill. The grain was sown May 13; the barley was harvested August 18, the oats September 3 and the wheat September 8. The plots were one-twentieth acre each. The land was a clay loam in a good state of fertility, having been in roots the previous year, being manured for that crop with 25 one-horse cardloads of stable manure per acre. The following grains were grown, giving the following yields :—

| | Yield per Acre.<br>Bush. | <br>Lbs. |
|---|---|---|
| Plot Banner Oats— | | |
| No. 1, without clover | 98 | 28 |
| No. 2, with clover | 104 | 14 |
| No. 3, without clover | 111 | 6 |
| No. 4, with clover | 102 | 17 |
| Plot White Fife Wheat— | | |
| No. 1, without clover | 41 | .. |
| No. 2, with clover | 39 | 30 |
| No. 3, without clover | 41 | 40 |
| No. 4, with clover | 40 | 20 |
| Plot Odessa Barley— | | |
| No. 1, without clover | 59 | 28 |
| No. 2, with clover | 59 | 38 |
| No. 3, without clover | 61 | 12 |
| No. 4, with clover | 60 | 40 |

## SPECIAL EXPERIMENTS WITH FERTILIZERS.

These experiments which have been conducted for the past four years were continued this year. The object of these tests is to ascertain the relative usefulness of fertilizers commonly used for field crops of various kinds. The plots were one-eighth acre each, 38 x 143⅓ feet for each kind of fertilizer used. These were subdivided into ten strips 14 feet wide, each running lengthwise across all the different fertilized plots. These strips were sown with ten different kinds of crops, namely, potatoes, turnips, carrots, mangels, oats, wheat, barley, pease, corn and mixed grain, making in all 140 plots. A margin of two feet was left between each plot and one foot between each crop plot. Two plots were left without any fertilizer to serve as check plots. The strips that are in grain one year are planted to roots, potatoes and corn the following year. The quantity and kind of fertilizer used is applied each year. Each of the crops were sown at the same time as the uniform test plots, with the same amount of seed per acre, and were cultivated in the same manner. The following table gives the yield per acre of these various crops :—

| Fertilizer Used per acre. | Barley, Canadian Thorpe. | | Oats, Tartar King. | | Wheat, Colorado. | | Barley, oats and pease. | | Pease, Golden Vine. | | Corn, Longfellow. | | Turnips, Purple Top. | | Mangels, Giant Yellow Intermediate. | | Carrots, Half Long White. | | Potatoes, Delaware. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| Manure, 30 tons......... | 62 | 4 | 54 | 8 | 36 | 40 | 57 | 20 | 51 | 40 | 12 | 500 | 30 | 1,500 | 33 | 1,300 | 21 | 1,800 | 380 | |
| Manure, 15 tons, fertilizer, 250 lbs................ | 60 | 0 | 50 | 0 | 33 | 20 | 55 | | 53 | 20 | 12 | 1,000 | 31 | 1.500 | 33 | 200 | 22 | 100 | 370 | |
| Complete fertilizer, 1,000 lbs ..... .. ......... | 45 | 40 | 39 | 28 | 30 | | 47 | 20 | 48 | 20 | 11 | 500 | 23 | | 18 | 1,500 | 19 | 400 | 328 | 20 |
| Complete fertilizer, 500 lbs | 41 | 32 | 37 | 24 | 28 | 20 | 42 | 10 | 48 | 20 | 10 | 1,000 | 22 | 1,000 | 18 | 200 | 20 | 500 | 306 | 40 |
| Check..... ............... | 37 | 24 | 27 | 4 | 23 | 20 | 37 | 20 | 38 | 20 | 6 | 700 | 17 | 1,500 | 11 | 1,500 | 14 | 900 | 196 | 40 |
| Bone meal, 1,000 lbs..... | 43 | 36 | 39 | 28 | 26 | 40 | 50 | | 46 | 40 | 10 | 1,500 | 30 | | 22 | | 17 | 600 | 290 | |
| " 500 " .... | 47 | 44 | 37 | 24 | 25 | | 47 | 20 | 50 | | 10 | 1,200 | 29 | | 19 | 800 | 15 | 1,200 | 260 | |
| Ashes 2,500 " ... | 52 | 4 | 35 | 20 | 28 | 40 | 50 | | 59 | | 11 | 700 | 25 | 500 | 21 | 700 | 18 | 400 | 435 | |
| Manure, rotted, 20 tons.. | 68 | 36 | 58 | 16 | 41 | 40 | 70 | | 58 | 20 | 14 | 500 | 32 | 1,000 | 34 | 1,300 | 21 | 1,900 | 540 | |
| Check.................. | 39 | 28 | 25 | | 13 | 20 | 25 | | 33 | 20 | 5 | | 4 | 500 | 1 | 500 | 5 | 1,700 | 228 | 20 |
| Land plaster, 500 lbs.... | 41 | 32 | 27 | 4 | 16 | 40 | 30 | | 30 | | 6 | 1,500 | 6 | 700 | 1 | 700 | 6 | 400 | 203 | 20 |
| Salt, 500 " .. | 45 | 40 | 33 | 16 | 20 | | 43 | 30 | 36 | 40 | 7 | | 21 | 1,500 | 7 | 500 | 13 | 1,800 | 175 | |
| Marsh mud, 100 tons.... | 62 | 24 | 41 | 32 | 25 | | 50 | | 40 | | 10 | 1,500 | 23 | | 27 | 600 | 21 | 1,300 | 223 | 20 |
| Manure, green, 20 " .... | 72 | 44 | 62 | 24 | 43 | 20 | 67 | 20 | 56 | 40 | 13 | 1,700 | 35 | 500 | 43 | 200 | 28 | 900 | 483 | 20 |

## HAY.

The crop of timothy and clover hay was light—twenty-four acres of upland yielded 44 tons 837 lbs.

Twelve acres of underdrained marsh land yielded 18 tons 1,775 lbs., and 33 acres, not underdrained, yielded 39 tons 660 lbs. This made a total of 102 tons 1,272 lbs. about one-third less than an average crop. This was all secured in good condition.

## SUMMARY OF CROPS ON EXPERIMENTAL FARM, NAPPAN.

| Grain Field Crops. | Bushels. |
|---|---|
| Oats.................................. | 291 |
| Barley.................................. | 56½ |
| Mixed grain.................................. | 812 |
| Buckwheat.................................. | 124½ |
| | 1,284 |

| From Uniform Trial Plots. | Bushels. |
|---|---|
| Oats.................................. | 96 |
| Wheat.................................. | 46 |
| Barley.................................. | 42½ |
| Pease.................................. | 24½ |
| Buckwheat.................................. | 3½ |
| | 212½ |

| Roots, &c., Field Crops. | Bushels. |
|---|---|
| Turnips | 4,609 |
| Mangels | 2,818 |
| | 7,427 |

| From Uniform Trial Plots. | Bushels. |
|---|---|
| Turnips | 408 |
| Mangels | 216 |
| Carrots | 102 |
| Sugar beets | 86 |
| Potatoes | 237 |
| | 1,049 |

| Indian Corn Cut Green for Ensilage. | Tons. |
|---|---|
| Field crops | 63½ |
| From uniform trial plots | 2½ |
| | 66 |

| | Tons. | Lbs. |
|---|---|---|
| Hay | 102 | 1,272 |

## GRAIN AND POTATO DISTRIBUTION.

Some of the most promising varieties of grain and potatoes were again distributed this year to farmers who made application. The following number of three-pound packages were sent out for trial :—

| | |
|---|---|
| Potatoes | 354 |
| Oats | 212 |
| Barley | 62 |
| Wheat | 68 |
| Pease | 42 |
| Buckwheat | 16 |
| Rye | 1 |
| Total | 755 |

## EXHIBITIONS, AGRICULTURAL MEETINGS AND EXCURSIONS TO FARM

An exhibit was made of farm produce at the Nova Scotia provincial exhibition, Halifax, September 9 to 17; at Fredericton, N.B., September 21 to 26, and Sussex, N.B., September 30 to October 1. Charlottetown, P.E.I., was unavoidably omitted on acount of its being on the same date as Fredericton, and as no exhibit of experimental farm products had ever been made at Fredericton it was thought best to give that place the preference.

I have attended and given addresses at quite a number of agricultural meetings throughout the provinces of Nova Scotia and New Brunswick during the year, besides delivering a series of lectures to the students at the Sussex, N.B., dairy school in March.

As in other years, many visitors have visited the farm, and there have been several farmers' excursions, the largest of which was that of the Pictou County Farmers' Association on July 9, when about 1,200 were present. Smaller excursions from the surrounding country, of about 20 to 100 persons, have been common. Although railway rates are quite reasonable for large excursions, smaller parties do not find the rates so favourable, and the fact of no hotel accommodation being available, no doubt tends to hinder many from visiting the farm.

## CORRESPONDENCE.

During the year 1,840 letters were received and 1,685 sent out.

## HORSES.

The stock of horses at present on the farm consists of three teams of heavy working horses, one express horse and one driver. Total, 8. One draught horse was bought during the year. All are in good condition.

## CATTLE.

The herd of dairy cattle on the farm at present numbers 46 head, as follows:—

1 Guernsey bull, 5 years old.
1 Ayrshire bull, 2½ years old.
1 Jersey cow.
3 Holstein cows.
2 Guernsey cows.
1 Guernsey heifer, 2½ years old.
5 Ayrshire cows.
2 Ayrshire heifers, 1½ years.
4 Grade Ayrshire heifers, 2½ years.
16 Grade milch cows.
3 Ayrshire heifers, 8 to 10 months.
1 Holstein heifer, 8 months.
8 Grade Ayr. heifers 8 to 10 mos.

Steers have also been secured for experiment to the number of 36, as follows:—

12 three-year-old steers, short-horn grades.
9 two-year-old steers, short-horn grades.
10 one-year-old steers, short-horn grades.
5 steer calves, short-horn grades.

Total number of cattle, 82.

## EXPERIMENT WITH DAIRY COWS.

This experiment was again carried on with a view to further determine whether a fairly good dairy herd, well fed and cared for, would leave a credit balance after paying for feed consumed, their milk being sent to the creamery and their food being charged at current market price.

The different feeds were charged at the following prices:—Wheat, bran, $20 per ton; oats, $25 per ton; oil cake, $33 per ton; gluten meal, $28 per ton; making an average price of mixed meal ration, as per proportion fed to cows, of 1⅓c. per pound. Roots at $2 per ton, ensilage at $2 per ton, and hay at $8 per ton.

The ration fed to cows in full milk was: Ensilage or roots, 50 lbs.; meal, 10 lbs; hay, 10 lbs., making a cost of 21 cents per cow per day.

In summer months, while milking, they were charged $2.50 per month, and when dry $1 per month.

When dry in winter they were charged $3 per month. Different quantities were fed to different cows, according to their capacity to consume and produce, and charged accordingly.

They were kept in the stable from November 1, 1902, to June 1, 1903, except on occasional fine days, when they were allowed out in the yard.

They were fed, watered and milked each day at as nearly regular intervals as possible, and by the same persons.

The summer feed was practically all summer soiling crops, rye, clover, oats, pease and vetches, grown together and sown at different times.

The milk of each cow was weighed at milking twice each day, and a careful record kept of the number of pounds given.

The percentage of fat in the milk of each cow was determined by the Babcock milk tester, and the fat credited to the cows on the basis that 85 pounds of fat produces 100 pounds of marketable butter.

The milk was sent to the Nappan dairy station, and the cows were credited with the butter produced at the prices paid to all patrons of that station, which averaged for the winter months 24c. per pound and for the summer months 21⅓c. per pound, which, after deducting 4 cents per pound for manufacturing and hauling milk, leaves 20 cents per pound for winter butter and 17⅓ cents per pound for summer butter.

The skim-milk was fed to calves and pigs, and credited to the cows at the rate of 15 cents per 100 pounds.

The following table will show the results obtained during the year :—

| Name. | Age. | Breed. | Date of Dropping last Calf. | Days in Milk. | Milk. | Fat. | Butter. | Value Skim Milk | Total Credit. | Cost Feed. | Cost making Butter at 4 c. p. lb. | Total Cost | Profit. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Lbs. | p. c. | Lbs. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. | $ cts. |
| Eva Rooker............ ... | 8 yrs. | Holstein.. .... | Jan. 1, 1903... | 285 | 10,040 | 3·3 | 389·78 | 10 04 | 100 95 | 50 75 | 15 59 | 66 34 | 34 61 |
| Corie.......... .. ...... | 6 " | Ayrsh. Grade. | Dec. 15, 1902... | 310 | 10,010 | 3·6 | 400·40 | 10 01 | 103 21 | 53 30 | 16 01 | 69 31 | 33 90 |
| Aiton........ .. ......... | 8 " | " . | Jan. 1, 1903... | 270 | 8,860 | 3·6 | 375·24 | 8 86 | 95 93 | 50 00 | 15 00 | 65 00 | 30 93 |
| Molly........ . ......... | 10 " | " . | " 3, 1903... | 270 | 8,530 | 3·8 | 369·56 | 8 53 | 94 33 | 50 00 | 14 78 | 64 78 | 29 55 |
| Lucy.... .. .. ... ........ | 10 " | " . | Feb. 1, 1903... | 245 | 8,110 | 3·5 | 333·93 | 8 11 | 86 04 | 46 40 | 13 35 | 59 75 | 26 29 |
| Curly..... ...... .. .... | 4 " | Ay. Gn. Grade | Dec. 1, 1902... | 240 | 6,920 | 4·0 | 325·64 | 6 92 | 82 43 | 45 00 | 13 02 | 58 02 | 24 41 |
| Ilda Rooker .... ........ | 4 " | Holstein.. .... | " 10, 1902... | 280 | 8,850 | 3·3 | 343·58 | 8 85 | 88 55 | 51 80 | 13 74 | 65 54 | 23 01 |
| Rex's Maud .... ...... ... | 8 " | Guernsey..... | " 20, 1902... | 285 | 6,110 | 4·7 | 337·82 | 6 11 | 85 29 | 50 15 | 13 51 | 63 66 | 21 63 |
| Carrie..... .............. | 10 " | Ayrsh. Grade. | Feb. 1, 1903... | 260 | 7,140 | 3·7 | 310·79 | 7 14 | 79 82 | 47 90 | 12 43 | 60 33 | 19 49 |
| Sonsy....... .... ........ | 7 " | Ayrshire...... | " 1, 1903... | 270 | 7,110 | 3·6 | 301·12 | 7 11 | 75 71 | 46 70 | 12 04 | 58 74 | 16 97 |
| Yellow Kate .. .......... | 3 " | " ..... | Jan. 1, 1903... | 300 | 7,300 | 3·6 | 309·17 | 7 30 | 79 24 | 50 00 | 12 36 | 62 36 | 16 88 |
| Daisy....................... | 8 " | Ayrsh. Grade. | " 1, 1903... | 270 | 7,340 | 3·4 | 293·60 | 7 34 | 75 63 | 48 50 | 11 74 | 60 24 | 15 39 |
| Jessie P.... .... .... .... | 9 " | " . | March 4, 1903... | 260 | 6,810 | 3·6 | 288·42 | 6 81 | 72 85 | 46 70 | 11 53 | 58 23 | 14 62 |
| Rae ............... .. .... | 2½ " | Ay. Gn. Grade | Dec. 1, 1902... | 270 | 5,970 | 3·9 | 273·91 | 5 97 | 69 73 | 48 50 | 10 95 | 59 45 | 10 28 |
| Lizzie.................. ..... | 2½ " | " . | " 1, 1902. . | 270 | 5,810 | 3·9 | 266·57 | 5 81 | 67 64 | 48 50 | 10 66 | 59 16 | 8 48 |
| Blue Bell.... ............ | 2½ " | Ayrsh. Grade. | " 1, 1902... | 270 | 5,910 | 3·6 | 250·29 | 5 91 | 63 93 | 48 50 | 10 01 | 58 51 | 5 42 |
| Betsy.......... .......... | 2½ " | " " | " 1, 1902... | 270 | 5,740 | 3·5 | 236·35 | 5 74 | 60 70 | 48 50 | 9 45 | 57 95 | 2 75 |
| Rose......... .... ........ | 10 " | Jersey Grade.. | Mar. 15, 1903... | 255 | 5,400 | 3·8 | 241·17 | 5 40 | 57 91 | 46 10 | 9 64 | 56 64 | 2 17 |
| Mary................... .... | 10 " | HolsteinGrade | April 1, 1903... | 240 | 5,540 | 3·4 | 221·60 | 5 54 | 53 67 | 44 30 | 8 86 | 53 16 | 0 51 |
| Ida B...................... | 11 " | Ayrsh. Grade. | " 1, 1903... | 240 | 5,240 | 3·6 | 221·92 | 5 24 | 53 41 | 44 30 | 8 87 | 53 17 | 0 24 |

## EXPERIMENTS WITH STEERS.

### TIED IN STALLS *vs.* FED IN LOOSE BOX.

This experiment was again carried on with the view of testing the advisability of feeding in loose boxes, as contrasted with similar steers fed tied in stalls.

Sixteen three-year-old steers were used for this test in two lots of eight each, of as nearly as possible equal form, fatness and weight (Shorthorn grades.)

All weights were taken after a fast of 14 hours, that is, at 9 a.m., without feed.

All were dehorned previous to beginning of test.

All lots were fed alike, as nearly as possible, from start to finish of test, and kept in the stable all the time, except on occasional fine days, when they were let out for a time, averaging not more than once a week.

The feeds were charged at the following prices: Hay, $8 per ton; roots, $2 per ton; ensilage, $2 per ton; mixed meals averaged $24 per ton; as per proportion fed.

### RECORD of steers fed from Dec. 1, 1902, to April 30, 1903.

#### EXPERIMENT I—LOT I—DEHORNED, FED IN LOOSE BOX.

| Numbers. | Dec. 1. | Dec. 31. | Gain. | Jan. 30. | Gain. | Mar. 1. | Gain. | Mar. 31. | Gain. | Apr. 30. | Gain. | Total Gain. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lbs. | Lbs. | Lbs | Lbs. | Lbs | Lbs. | Lbs | Lbs. | Lbs | Lbs. | Lbs | Lbs. |
| 9 | 1,240 | 1,310 | 70 | 1,370 | 60 | 1,450 | 80 | 1,510 | 60 | 1,555 | 45 | 315 |
| 10 | 1,260 | 1,340 | 80 | 1,400 | 60 | 1,450 | 50 | 1,500 | 50 | 1,540 | 40 | 280 |
| 11 | 1,285 | 1,370 | 85 | 1,440 | 70 | 1,500 | 60 | 1,550 | 50 | 1,585 | 35 | 300 |
| 12 | 1,265 | 1,360 | 95 | 1,450 | 90 | 1,510 | 60 | 1,570 | 60 | 1,600 | 30 | 335 |
| 13 | 1,220 | 1,320 | 100 | 1,400 | 80 | 1,475 | 75 | 1,520 | 45 | 1,550 | 30 | 330 |
| 14 | 1,240 | 1,330 | 90 | 1,410 | 80 | 1,480 | 70 | 1,530 | 50 | 1,545 | 15 | 305 |
| 15 | 1,170 | 1,230 | 60 | 1,300 | 70 | 1,340 | 40 | 1,375 | 35 | 1,400 | 25 | 230 |
| 16 | 1,100 | 1,200 | 100 | 1,260 | 60 | 1,340 | 80 | 1,400 | 60 | 1,440 | 40 | 340 |
| | 9,780 | 10,460 | 680 | 11,030 | 570 | 11,545 | 515 | 11,955 | 410 | 12,215 | 260 | 2,435 |

#### EXPERIMENT I—LOT II—DEHORNED, TIED IN STALLS.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1,545 | 1,625 | 80 | 1,700 | 75 | 1,770 | 70 | 1,810 | 40 | 1,855 | 45 | 310 |
| 2 | 1,335 | 1,440 | 105 | 1,510 | 70 | 1,580 | 70 | 1,640 | 60 | 1,665 | 25 | 330 |
| 3 | 1,200 | 1,260 | 60 | 1,325 | 65 | 1,400 | 75 | 1,470 | 70 | 1,510 | 40 | 310 |
| 4 | 1,150 | 1,200 | 50 | 1,240 | 40 | 1,300 | 60 | 1,350 | 50 | 1,385 | 35 | 235 |
| 5 | 1,120 | 1,190 | 70 | 1,230 | 40 | 1,280 | 50 | 1,320 | 40 | 1,340 | 20 | 220 |
| 6 | 1,160 | 1,220 | 60 | 1,270 | 50 | 1,330 | 60 | 1,400 | 70 | 1,435 | 35 | 275 |
| 7 | 1,200 | 1,290 | 90 | 1,350 | 60 | 1,400 | 50 | 1,450 | 50 | 1,490 | 40 | 290 |
| 8 | 1,060 | 1,140 | 80 | 1,200 | 60 | 1,260 | 60 | 1,310 | 50 | 1,340 | 30 | 280 |
| | 9,770 | 10,365 | 595 | 10,825 | 460 | 11,320 | 495 | 11,750 | 430 | 12,020 | 270 | 2,250 |

EXPERIMENT I—AVERAGE COST OF 1 STEER PER DAY FOR ENTIRE PERIOD.

| Period. | Daily Ration. | Daily Cost. | Cost for Period. | Total. |
|---|---|---|---|---|
| 1902. | | $ cts. | $ cts. | $ cts. |
| Dec. 1 to Dec. 31 | Roots 90 lbs. | 0 09 | 2 70 | |
| | Hay 10 " | 0 03⅗ | 1 08 | |
| | Meal 3 " | 0 04 | 1 20 | 4 90 |
| 1903. | | | | |
| Dec. 31 to Jan. 30 | Roots 60 lbs. | 0 04 | 1 80 | |
| | Hay 10 " | 0 04 | 1 20 | |
| | Meal 4 " | 0 04⅘ | 1 44 | 4 44 |
| Jan. 30 to Mar. 1 | Roots 40 lbs. | 0 04 | 1 20 | |
| | Hay 12 " | 0 04⅘ | 1 44 | |
| | Meal 6 " | 0 07⅕ | 2 16 | 4 80 |
| Mar. 1 to Mar. 31 | Roots 30 lbs. | 0 03 | 0 90 | |
| | Hay 15 " | 0 06 | 1 80 | |
| | Meal 8 " | 0 09⅗ | 2 88 | 5 58 |
| Mar. 31 to April 30 | Roots 20 lbs. | 0 02 | 0 60 | |
| | Hay 15 " | 0 06 | 1 80 | |
| | Meal 10 " | 0 12 | 3 60 | 6 00 |
| Cost of feed 1 steer | | | | 25 72 |
| " 16 steers | | | | 411 52 |

SUMMARY OF EXPERIMENT 1.

*Financial Part.*

| | | |
|---|---|---|
| Original weight of 16 steers, 19,550 lbs., at 4⅛c. per lb. | $ | 806 18 |
| Weight at finish of 16 steers, 24,235 lbs. at 5¼c. | | 1,272 33 |
| Balance | $ | 466 15 |
| Cost of feed for lot, 150 days | | 411 52 |
| Net profit | $ | 54 63 |
| Daily rate of gain per steer | Lbs. | 1·94 |
| Cost of 1-lb. gain | Cts. | 8·78 |
| Cost of feed per day per steer | " | 17·14 |
| Profit per steer | | $3.41 |

## STEER-CALF EXPERIMENTS.

(Continued from December 1, 1902.)

This experiment, with a view to determine the comparative economy of feeding calves a full fattening ration from the start, as contrasted with a limited growing ration, begun in 1901 and repeated in 1902, was continued with 10 calves in each experiment, in two lots of five each. Those commenced in 1901, termed experiment 1, being continued so. Those commenced in 1902, termed experiment 11, also continued so.

Owing to the difficulty in securing suitable calves for this experiment, it was not repeated in the spring of 1903, but suitable calves were secured December 1 at six months old, and were put in at that age and date, with a view to continuing this experiment from that age instead of from birth.

In estimating the cost of feeding calves, the following values were placed on the different feeds:—Wheat bran, $20 per ton; crushed oats, $24 per ton; oil cake, $33 per ton; gluten meal, $28 per ton; roots or ensilage, $2 per ton; hay, $8 per ton; straw, $4 per ton.

## STEER CALF EXPERIMENT.

### Experiment 1.—Continued from December 1, 1902.

The full fattening lot of this experiment were considered finished April 30, 1903, and sold. The limited growing lot will be kept until April 30, 1904, when they are expected to be finished, when a comparison of the relative cost from birth to block can be made.

The following tables show the gains per month and the amount of food consumed :

EXPERIMENT I.—FULL FATTENING RATION. CALVES MAY 1901, CONTINUED FROM DECEMBER 1, 1902.

| Lot I. | Weight at Start. | Weight at Finish. | Gain. |
|---|---|---|---|
| Period. | Lbs. | Lbs. | Lbs. |
| December 1 to December 31 | 4,620 | 4,955 | 335 |
| December 31 to January 30 | 4,955 | 5,335 | 380 |
| January 30 to March 1 | 5,335 | 5,735 | 400 |
| March 1 to March 31 | 5,735 | 6,095 | 360 |
| March 31 to April 30 | 6,095 | 6,355 | 260 |

| Period. | Daily Ration. | Daily Cost. | Cost for Period. | Total. |
|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts. |
| December 1 to December 31 | Roots, 60 lbs | 0 06 | 1 20 | |
| | Hay, 8 lbs | 0 03⅕ | 0 96 | |
| | Meal, 3 lbs | 0 04 | 1 20 | 3 36 |
| December 31 to January 30 | Roots, 60 lbs | 0 06 | 1 80 | |
| | Hay, 10 lbs | 0 04 | 1 20 | |
| | Meal, 4 lbs | 0 04⅘ | 1 44 | 4 44 |
| January 30 to March 1 | Roots, 40 lbs | 0 04 | 1 20 | |
| | Hay, 10 lbs | 0 04 | 1 20 | |
| | Meal, 5 lbs | 0 06 | 1 80 | 4 20 |
| March 1 to March 31 | Roots, 30 lbs | 0 03 | 0 90 | |
| | Hay, 10 lbs | 0 04 | 1 20 | |
| | Meal, 6 lbs | 0 07⅕ | 2 16 | 4 26 |
| March 31 to April 30 | Roots, 20 lbs | 0 02 | 0 60 | |
| | Hay, 12 lbs | 0 04⅘ | 1 44 | |
| | Meal, 7 lbs | 0 08⅖ | 2 52 | 4 56 |

### SUMMARY OF EXPERIMENT 1.

| | Lbs. |
|---|---|
| Weight at start, Dec. 1, 1902, 5 steers | 4,620 |
| Weight at finish, April 1, 1903, 5 steers | 6,355 |
| Gain for period | 1,735 |
| Daily rate of gain per steer | 2·32 |
| Cost of feed per day per steer $ | 0 12·54 |
| Cost of 1-lb. gain | 0 06 |
| Cost of feed for lot, 150 days | 104 10 |

### EXPERIMENT I.—LIMITED GROWING RATION. CALVES MAY 1901. CONTINUED FROM DECEMBER 1, 1902.

| Lot II. | Weight at Start. | Weight at Finish. | Gain. |
|---|---|---|---|
| Period. | Lbs. | Lbs. | Lbs. |
| December 1 to December 31, 1902 | 3,485 | 3,665 | 180 |
| December 31 to January 30 | 3,665 | 3,840 | 175 |
| January 30 to March 1 | 3,840 | 4,000 | 160 |
| March 1 to March 31 | 4,000 | 4,190 | 190 |
| March 31 to April 30 | 4,160 | 4,395 | 205 |
| April 30 to May 30 | 4.395 | 4,495 | 100 |
| May 30 to November 1 | 4,495 | 4,700 | 205 |
| November 1 to December 1 | 4,700 | 5,160 | 460 |

### EXPERIMENT I.—LIMITED GROWING RATION.—CONTINUED FROM DECEMBER 1, 1902. LOT II.

| Period. | Daily Ration. | Daily Cost. | Cost for Period. | Total. |
|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts. |
| December 1 to December 31 | Roots, 40 lbs | 0 04 | 1 20 | |
| | Hay, 2 lbs | 0 00$\frac{4}{5}$ | 0 24 | |
| | Straw, 5 lbs | 0 00$\frac{2}{15}$ | 0 06 | |
| | Total . . 47 lbs. | 0 05 | 1 50 | 1 50 |
| December 31 to January 30 | Roots, 40 lbs | 0 04 | 1 20 | |
| | Hay, 2 lbs | 0 00$\frac{4}{5}$ | 0 24 | |
| | Straw, 5 lbs | 0 00$\frac{1}{5}$ | 0 06 | |
| | Total.... 47 lbs. | 0 05 | 1 50 | 1 50 |
| January 30 to March 1 | Roots, 40 lbs | 0 04 | 1 20 | |
| | Hay, 5 lbs | 0 02 | 0 60 | |
| | Total.... 45 lbs. | 0 06 | 1 80 | 1 80 |
| March 1 to March 31 | Roots, 40 lbs | 0 04 | 1 20 | |
| | Hay, 5 lbs | 0 02 | 0 60 | |
| | Total.... 45 lbs. | 0 06 | 1 80 | 1 80 |
| March 31 to April 30 | Roots, 30 lbs | 0 03 | 0 90 | |
| | Hay, 8 lbs | 0 03$\frac{1}{5}$ | 1 08 | |
| | Total.... 38 lbs. | 0 06$\frac{1}{5}$ | 1 98 | 1 98 |

### EXPERIMENT I.—LOT II.—*Concluded.*

| Period. | Daily Ration. | Daily Cost. | Cost for Period. | Total. |
|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts. |
| April 30 to May 30 | Roots, 30 lbs.<br>Hay, 10 lbs. | 0 03<br>0 04 | 0 90<br>1 20 | |
| May 30 to November 1 | At pasture @ $3 per steer | | | 2 10<br>3 00 |
| November 1 to December 1 | Roots, 60 lbs.<br>Hay, 8 lbs.<br>Meal, 3 lbs. | 0 06<br>0 03⅕<br>0 04 | 1 80<br>1 08<br>1 20 | |
| | Total ... 71 lbs. | 0 13⅕ | 4 08 | 4 08 |
| Cost of feed for 1 steer 365 days | | | | 17 76 |

### SUMMARY OF EXPERIMENT I.—LIMITED GROWING RATION.

Continued from December 1, 1902.—Lot 11.

| | | |
|---|---|---|
| | | Lbs. |
| Weight at start, December 1, 1902, 5 steers | | 3,487 |
| Weight at finish, December 1, 1903, 5 steers | | 5,160 |
| Gain for period | | 1,675 |
| Daily rate of gain per steer | lbs. | ·86 |
| Cost of feed per day per steer (winter) | cts. | 7 |
| Cost of feed per day per steer (summer) | " | 1·50 |
| Cost of feed per day per steer for period | " | 4·87 |
| Cost of 1 lb. gain | " | 5·30 |
| Cost of feed for lot 1 year | | $88 80 |

### STEER-CALF EXPERIMENT.—EXPERIMENT II.

(Continued from December 1, 1902.)

The following tables show results to December 1, 1903.—

### FULL FATTENING RATION.—EXPERIMENT II.—CONTINUED FROM DECEMBER 1, 1902. LOT I.

| Period. | Weight at Start. | Weight at Finish. | Gain. |
|---|---|---|---|
| 1902. | Lbs. | Lbs. | Lbs. |
| December 1 to December 31 | 2,580 | 2,800 | 220 |
| 1903. | | | |
| December 31 to January 30 | 2,860 | 3,010 | 210 |
| January 30 to March 1 | 3,010 | 3,200 | 190 |
| March 1 to March 31 | 3,200 | 3,450 | 250 |
| March 31 to April 30 | 3,450 | 3,600 | 150 |
| April 30 to May 30 | 3,600 | 3,800 | 200 |
| May 30 to June 30 | 3,800 | 4,100 | 300 |
| June 30 to July 30 | 4,100 | 4,295 | 195 |
| July 30 to August 30 | 4,295 | 4,410 | 115 |
| August 30 to September 30 | 4,410 | 4,700 | 290 |
| September 30 to October 30 | 4,700 | 4,980 | 280 |
| October 30 to December 1 | 4,980 | 5,220 | 240 |
| Total gain five steers for one year | | 2,640 | |

FULL FATTENING RATION.—EXPERIMENT II—CON. LOT I.

| Period. | Daily Ration. | Daily Cost. | Cost for Period. | Total. |
|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts. |
| Dec. 1 to Dec. 31 | Roots. 15 lbs | 0 01½ | 0 45 | |
| | Meal, 2 lbs | 0 02⅖ | 0 72 | |
| | Hay, 2½ lbs | 0 01 | 0 30 | 1 47 |
| Dec. 31 to Jan. 30 | Roots, 20 lbs | 0 02 | 0 60 | |
| | Meal, 2 lbs | 0 02⅖ | 0 72 | |
| | Hay, 2½ lbs | 0 01 | 0 30 | 1 62 |
| Jan. 30 to Mar. 1 | Roots, 25 lbs | 0 02½ | 0 75 | |
| | Meal, 3 lbs | 0 04 | 1 20 | |
| | Hay, 2½ lbs | 0 01 | 0 30 | 2 25 |
| Mar. 1 to Mar. 31 | Roots, 25 lbs | 0 03 | 0 90 | |
| | Meal, 3 lbs | 0 04 | 1 20 | |
| | Hay, 2½ lbs | 0 01 | 0 30 | 2 40 |
| Mar. 31 to April 30 | Roots, 30 lbs. | 0 03 | 0 90 | |
| | Meal, 3 lbs | 0 04 | 1 20 | |
| | Hay, 4 lbs | 0 01⅗ | 0 48 | 2 58 |
| April 30 to May 30 | Roots, 30 lbs | 0 03 | 0 90 | |
| | Meal, 3 lbs | 0 04 | 1 20 | |
| | Hay, 4 lbs | 0 01⅗ | 0 48 | 2 58 |
| May 30 to June 30 | Roots, 30 lbs | 0 03 | 0 90 | |
| | Meal, 3 lbs | 0 04 | 1 20 | |
| | Hay, 5 lbs | 0 02 | 0 60 | 2 70 |
| June 30 to July 30 | Green feed, 40 lbs | 0 04 | 1 20 | |
| | Meal, 2 lbs | 0 02⅖ | 0 72 | 1 92 |
| July 30 to Aug. 28 | Green feed, 40 lbs | 0 04 | 1 20 | |
| | Meal, 2 lbs | 0 02⅖ | 0 72 | 1 92 |
| Aug. 28 to Oct. 1 | Green feed, 40 lbs | 0 04 | 1 36 | |
| | Meal, 3 lbs | 0 04 | 1 36 | 2 72 |
| Oct. 1 to Nov. 1 | Roots and G. F., 40 lbs | 0 04 | 1 20 | |
| | Meal, 3 lbs | 0 04 | 1 20 | 2 40 |
| Nov. 1 to Dec. 1 | Roots, 40 lbs | 0 04 | 1 20 | |
| | Meal, 3 lbs | 0 04 | 1 20 | |
| | Hay, 5 lbs | 0 02 | 0 60 | 3 00 |
| | Cost to feed 1 steer, 1 year | | | 27 56 |

SUMMARY, FULL FATTENING RATION, EXPERIMENT II. LOT I.

| | Lbs. |
|---|---|
| Weight at start, December 1, 1902 | 2,580 |
| Weight at finish, December 1, 1903 | 5,220 |
| Total gain for period | 2,640 |

| | | |
|---|---|---|
| Daily rate of gain per steer | lbs. | 1·44 |
| Cost of feed per day per steer | cts. | 7·55 |
| Cost of 1 lb. gain | " | 5·21 |
| Cost of feed for lot 1 year | | $137 80 |

### LOT II.—EXPERIMENT II.—CALVES OF 1902.—LIMITED GROWING RATION.—CONTINUED FROM DECEMBER 1902.

| Period | Weight at Start. | Weight at Finish. | Gain. |
|---|---|---|---|
| | Lbs. | Lbs. | Lbs. |
| December 1 to December 31 | 1,945 | 2,150 | 205 |
| December 31 to January 30 | 2,150 | 2,420 | 270 |
| January 30 to March 1 | 2,420 | 2,725 | 305 |
| March 1 to March 31 | 2,725 | 2,975 | 250 |
| March 31 to April 30 | 2,975 | 3,195 | 220 |
| April 30 to May 30 | 3,195 | 3,300 | 105 |
| May 30 to November 1 | 3,300 | 3,480 | 180 |
| November 1 to December 1 | 3,480 | 3,690 | 210 |
| Gain of lot for year | | | 1,745 |

### LOT II.—LIMITED GROWING RATION.

| Period. | Daily Rations. | Daily Cost. | Cost for Period. | Total. |
|---|---|---|---|---|
| | | $ cts. | $ cts. | $ cts. |
| December 1 to 31 | Roots, 15 lbs. | 0 01½ | 0 45 | |
| | Meal, 1 lb. | 0 01⅕ | 0 36 | |
| | Straw, 2½ lbs | 0 00½ | 0 15 | 0 96 |
| " 31 to Jan. 30 | Roots, 20 lbs. | 0 02 | 0 60 | |
| | Meal, 1 lb. | 0 01⅕ | 0 36 | |
| | Straw, 2½ lbs | 0 00½ | 0 15 | 1 11 |
| January 30 to March 1 | Roots, 25 lbs. | 0 02½ | 0 75 | |
| | Meal, 1 lb. | 0 01⅕ | 0 36 | |
| | Hay, 2½ lbs. | 0 01 | 0 30 | 1 41 |
| March 1 to March 31 | Roots, 30 lbs. | 0 03 | 0 90 | |
| | Meal, 1 lb. | 0 01⅕ | 0 36 | |
| | Hay, 2½ lbs. | 0 01 | 0 30 | 1 56 |
| " 31 to April 30 | Roots, 30 lbs. | 0 03 | 0 90 | |
| | Meal, 1 lb. | 0 01⅕ | 0 36 | |
| | Hay, 2½ lbs. | 0 01 | 0 30 | 1 56 |
| April 30 to May 30 | Roots, 30 lbs. | 0 03 | 0 90 | |
| | Hay, 4 lbs. | 0 01⅗ | 0 48 | 1 38 |
| May 30 to November 1 | Pasture at $3 per steer. | | | 3 00 |
| November 1 to Dec. 1 | Roots, 40 lbs. | 0 04 | 1 20 | |
| | Hay, 2 lbs. | 0 00⅘ | 0 24 | |
| | Straw, 5 lbs. | 0 01 | 0 30 | 1 74 |
| Total | | | | 12 72 |

SUMMARY.

| | Lbs. |
|---|---|
| Weight at start, December 1, 1902 | 1,945 |
| Weight at finish, December 1, 1903 | 3,690 |
| Total gain for period | 1,745 |

| | | |
|---|---|---|
| Daily rate of gain per steer | lbs. | ·95 |
| Cost of feed per day per steer (winter) | cts. | 4·52 |
| Cost of feed per steer (summer) | " | 1·50 |
| Cost of feed per day per steer for period | | $ 3 48 |
| Cost of 1 lb. gain | cts. | 3·64 |
| Cost of feed for lot, 1 year | | $63 60 |

## PIGS.

The herd of pigs on the farm consists of Yorkshires, Berkshires, and their grades and crosses, in all 60 head, as follows:—

1 Yorkshire boar, registered.
4 Yorkshire sows, registered.
1 Berkshire boar, registered.
2 Berkshire sows, registered.
6 grade brood sows.
46 grade pigs, from 1 to 6 months' old.

## EXPERIMENTS WITH SWINE.

### FEEDING IN PASTURE COMPARED WITH FEEDING IN PENS.

The experiment carried on in the summer of 1902, was repeated this year with 20 pigs of from 1 to 2 months old, in 2 lots of 10 each, of various breeds and crosses, each lot consisting of an equal number from each litter and termed lot 1 and lot 11:—lot 1 in pasture and lot 11 in pens.

They were fed an average ration of 2 lbs. buckwheat meal, shorts and wheat-bran, and 3 lbs. skim-milk, from July 1 to November 1, and pasture, which consisted of 1 acre of equal parts of rape, hairy or sand vetch, and spring vetch and peas mixed, sown side by side lengthwise of the field, and divided with hurdles crosswise of the field into six divisions.

The pigs were moved from division to division once every week. A portable house was used for shelter.

On November 1 the pigs were taken into pens, and fed a ration of 3 lbs. per day of a mixture of shorts, corn-meal and wheat-meal, until December 1.

The results are as follows:

### EXPERIMENTS WITH SWINE.—EXPERIMENT I.—LOT I.

FED ON PASTURE, JULY 1 TO NOVEMBER 1; FED IN PENS, NOVEMBER 1 TO DECEMBER 1.

| Number. | Breed. | Weight, July 1. | Weight, November 1. | Weight, December 1. | Days Fed. | Gained. |
|---|---|---|---|---|---|---|
| | | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| 1 | Yorkshire.......... ............ | 35 | 172 | 233 | 153 | 198 |
| 2 | " (D) Berkshire (S).. ... | 30 | 158 | 198 | 153 | 168 |
| 3 | " (D) Tamworth (S)..... | 24 | 137 | 184 | 153 | 160 |
| 4 | Berkshire (D) Yorkshire (S)... . | 29 | 148 | 192 | 153 | 163 |
| 5 | Chester (grade) ................ | 27 | 120 | 160 | 153 | 133 |
| 6 | Yorkshire....................... | 34 | 191 | 243 | 153 | 209 |
| 7 | " (D) Berkshire (S)...... . | 31 | 151 | 192 | 153 | 161 |
| 8 | " (D) Tamworth (S). ..... | 30 | 115 | 157 | 153 | 127 |
| 9 | Berkshire (D) Yorkshire (S)....... | 24 | 118 | 184 | 153 | 160 |
| 10 | Chester (grade) ... ......... .. . | 21 | 139 | 175 | 153 | 154 |

LOT II.—FED IN PENS, JULY 1 TO DECEMBER 1.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | Yorkshire...................... | 32 | 152 | 178 | 153 | 146 |
| 2 | " (D) Berkshire (S)...... | 30 | 140 | 161 | 153 | 131 |
| 3 | " (D) Tamworth (S). . . | 26 | 119 | 146 | 153 | 120 |
| 4 | Berkshire (D) Yorkshire (S)...... | 28 | 122 | 153 | 153 | 125 |
| 5 | Chester (grade).. .......... . . | 22 | 86 | 118 | 153 | 96 |
| 6 | Yorkshire....................... | 31 | 129 | 157 | 153 | 126 |
| 7 | " (D) Berkshire (S)....... | 24 | 128 | 152 | 153 | 128 |
| 8 | " (D) Tamworth (S)....... | 27 | 108 | 138 | 153 | 111 |
| 9 | Berkshire (D) Yorkshire (S). .... | 26 | 116 | 144 | 153 | 118 |
| 10 | Chester (grade)........ ........ | 18 | 102 | 141 | 153 | 123 |

| | Lbs. |
|---|---|
| Lot 1—average daily gain on pasture, July 1 to Nov. 1...... | ·95 |
| " " in pens, Nov. 1 to Dec. 1........ | 1·51 |
| " " entire period.... ....... .... .. | 1·06 |
| Cost per lb. gain entire period, exclusive of pasture.... ...... | 3·04c. |

| | Lbs. |
|---|---|
| Lot 11—average daily gain in pens, July 1 to Nov. 1........ | ·76 |
| " " Nov. 1 to Dec. 1.... .......... | ·92 |
| " " entire period .. .. .. .. ...... | ·80 |
| Cost per lb. gain entire period.... .... .... .... .......... | 4·05c. |

## SHEEP.

The flock of sheep at present consists of:—

1 pure bred Leicester ram.

5 pure bred Leicester ewes.

5 pure bred Shropshire ewes.

4 grade Shropshire ewes.

2 cross bred Leicester-Shropshire ewe lambs.

## POULTRY.

During the year four breeds of poultry were kept: B. P. Rocks, Black Minorcas, White Leghorns and Buff Wyandottes.

Two additional breeds were the number added this year, and now on hand is six. Barred P. Rocks, Black Minorcas, White Leghorns, Buff Wyandottes, White Wyandottes and Silver Grey Dorkings.

The breeding pens were made up as follows:—

| | Hens. | Cocks. |
|---|---|---|
| B. P. Rocks | 4 | 1 |
| Black Minorcas | 3 | 1 |
| W. Leghorns | 4 | 1 |
| Buff Wyandottes | 3 | 1 |

The season's chicks were all hatched by incubator, the incubator being filled 5 times.

During the winter season they were fed on corn-meal, shorts and crushed oats mashed in the morning, and whole grain in the afternoon. Green-bones, meat-scraps and oyster shells were regularly given and free access to water and dust bath.

The eggs laid during the year by the different breeds were as follows:—

| Variety. | Eggs laid. | Av. per hen. |
|---|---|---|
| 4. B. P. Rocks | 260 | 65 |
| 4. W. Leghorns | 340 | 85 |
| 3. B. Minorcas | 160 | 53 |
| 3. Buff Wyandottes | 250 | 83 |

In past years they were only allowed a run out part of the time as they were quite destructive to flowers and shrubs that grew close to their buildings, and as a consequence had to be kept in small yards the greater part of the summer.

This summer a yard of about ½ acre in extent was fenced off close to their building, which will serve as a run for the future, thus improving the conditions under which they have been kept.

## BEES.

Six colonies were put into winter quarters last December; all died through the winter.

## EXPERIMENTS TO TEST THE VALUE OF BUG DEATH AS COMPARED WITH PARIS GREEN AND BORDEAUX AND PARIS GREEN ON POTATOES.

The object of this experiment was to test the value of Bug Death as an insecticide as compared with Paris green, and also as an insecticide and fungicide as compared with bordeaux mixture and Paris green.

For this experiment a piece of ground was chosen adjoining the potato plots. The land was similar in character and had the same treatment. It was divided into three plots, each one-twentieth of an acre. The variety of potato used was the Delaware, and the plots were all planted May 22 and dug September 23. The vines were sprayed or dusted three times, July 21, August 4 and August 28.

Plot A.—Paris green, ½ lb., 1 gallon lime water, and water added to make 40 gallons. This was sprayed on the plants twice only, as no bugs were present after the second application.. For the first application 6¾ gallons were used; for the second 7½ gallons were used, making a total of 14½ gallons per plot of one-twentieth acre, or 290 gallons per acre for both applications, the mixture containing for the acre 3 lbs. 10 oz. of Paris green.

Plot B.—Bug Death dry was dusted on the leaves with a cheese cloth dusting bag. The vines were nicely covered, but not given an excessive amount. For the first application 4½ lbs. of Bug Death was used per plot; for the second, 5 lbs. per plot, and for the third, 4¾ lbs. per plot, making a total of 14¼ lbs. per plot, or 285 lbs. per acre in the three applications.

Plot C.—Bordeaux and Paris green mixture, made as follows:—Bluestone, 4 lbs.; lime, 4 lbs.; Paris green, ½ lb., and water added to make 40 gallons. For the first application seven gallons of the mixture was used, second application 8 gallons per plot, and third application 7½ gallons of Bordeaux alone, as it was not considered necessary to add Paris green, no bugs being present. This made a total of 22½ gallons to the plot of one-twentieth acre at three applications, or equal to 450 gallons of the mixture to the acre, for which 45 lbs. of bluestone, 45 lbs. lime and 3¾ lbs. of Paris green would be used.

MATERIAL USED AND COST PER ACRE.

| | |
|---|---|
| Plot A.—3 lbs. 10 oz. Paris green at 20c. per lb. | $ 0 72½ |
| Plot B.—285 lbs. Bug Death at $7 per hundred. | $19 95 |
| Plot C.—45 lbs. bluestone at 7c. per lb. | $ 3 15 |
| 45 " rock lime at 1c. | 0 45 |
| 3¾ " Paris green at 20c. | 0 75 |
| | $ 4 35 |

For killing bugs alone two applications of either Paris green or Bug Death are sufficient. Therefore, the cost of Plot A, as compared with Plot B per acre, is as follows:—

| | |
|---|---|
| Plot A.—3 lbs. 10 oz. Paris green at 20c. | $ 0 72½ |
| " B.—190 lbs. Bug Death at 7c. | 13 30 |

There was no blight on any of these plots. The following yields per acre were obtained.

*How Treated.*

| | Bus. | Lbs. |
|---|---|---|
| Plot B.—Bug Death | 373 | 20 |
| " C.—Bordeaux and Paris green | 310 | .. |
| " A.—Paris green | 290 | 20 |

## METEOROLOGICAL RECORD.

The maximum and minimum thermometrical observations for the year beginning December 1, 1902, and ending November 30, 1903 :—

| Month, | Maximum. | Minimum. |
|---|---|---|
| 1902. | | |
| December | 22nd 52° above zero | 10th 16° below zero |
| 1903. | | |
| January | 21st and 27th 41° above zero | 19th 12° " |
| February | 28th 50° above zero | 18th and 20th 5° below zero |
| March | 14th 53° " | 3rd 2° above zero |
| April | 29th 65° " | 7th 13° " |
| May | 28th 74° " | 16th 22° " |
| June | 10th 80° " | 4th 28° " |
| July | 11th 82° " | 29th 40° " |
| August | 20th 76° " | 3rd 36° " |
| September | 14th 80° " | 10th 32° " |
| October | 1st 69° " | 31st 23° " |
| November | 1st 4th 5th 57° above zero | 21st 11° " |

### RAINFALL.

| | | |
|---|---|---|
| April | 3·57 | inches. |
| May | ·68 | " |
| June | 2·29 | " |
| July | 2·07 | " |
| August | 2·40 | " |
| September | 3·63 | " |
| October | 5·78 | " |
| November | 7·98 | " |
| Total | 28:40 | " |

I have the honour to be. sir,
your obedient servant,

R. ROBERTSON,
*Superintendent.*

# REPORT OF THE HORTICULTURIST.

(W. S. Blair.)

Nappan, N.S., December 1, 1903.

To Dr. Wm. Saunders,
Director Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to submit hereith a report of some of the work done in the horticultural department of the Experimental Farm for the maritime provinces for the year 1903.

The spring generally was very favourable for getting work done, on account of more than usual dry weather. The mean average temperature for May was about equal to that of other years. June was not as warm as usual. July was about up to the average temperature, while August was considerably cooler. This made it unfavourable for plants that require plenty of heat to develop properly. The following table gives the mean average temperature for the months of May, June, July, August and September, as compared with those months of the years 1900-1901 and 1902:—

| Month. | Mean Temperature at Nappan. | | | | Rainfall, 1903. |
|---|---|---|---|---|---|
| | 1903. | 1902. | 1901. | 1900. | |
| | ° | ° | ° | ° | Inches. |
| May | 47·7 | 47·6 | 48·1 | 46·1 | 0·68 |
| June | 53·6 | 54·5 | 59·3 | 57 | 2·29 |
| July | 62·7 | 61·7 | 65·2 | 64·5 | 2·07 |
| August | 59·3 | 63·4 | 65·3 | 62·1 | 2·40 |
| September | 57·5 | 57·5 | 58·4 | 53·4 | 3·63 |

The exceptionally dry weather in May and to the latter part of June caused a slow and uneven germination of garden seeds. In some cases where there was not sufficient moisture to start them they remained dormant for several weeks. The dry weather was exceptionally trying to annual flowering plants; both those started from seed in the open ground and transplanted plants. There were frosts in June on the 1st, 2nd, 4th and 5th, doing considerable damage. Frost kept off unusually well in the fall, the first being on October 4 of 6°.

The apple crop here was about up to the average, and of excellent quality. The apple crop in the Annapolis and Cornwallis valleys and western end of the province was a good one. The apple spot was not so prevalent as usual, the season not favouring its development. The fruit developed well, and the percentage of inferior fruit is small. The fruit crop in the eastern end of the province is small. Prince Edward Island reports would indicate that on the average not one-third of a fair crop was gathered. New Brunswick reports a good crop of apples of excellent quality.

In plums we have to report a complete failure, due to the late frosts killing the blossoms. The report is an average crop in the Annapolis and Cornwallis valleys. Prince Edward Island reports that on the average one-half of a good yield was harvested.

Cherries here all suffered from late frosts. The frost and birds together have made it difficult to obtain a quart of ripe cherries the past three years. The pear crop was also a failure this year.

Strawberries, owing to the extremely dry weather, gave only one-half an average crop. A considerable shortage in this crop is also reported from all over the maritime provinces. The gooseberries, raspberries and currants were only a fair crop. Cranberries are reported one-third of a fair yield, due to the injury of blossoms from the late frosts.

The fruit trees have made a fair growth this season. The shrubs and ornamental trees made an average growth. An addition was made this season to the area devoted to ornamental trees and shrubs and many new varieties sent from the Central Farm at Ottawa were planted, all of which did well.

The collection of annuals and perennials are each year a source of much pleasure and profit to visitors. In this report I am presenting some of the information obtained from the annuals tested here during the past four years. I am also reporting the growth of hedges under test here. Experiments were again conducted with different varieties of vegetables, some of which are included in this report.

I beg to acknowledge the following donations: From John Byrne, Esq., Kentville, N.S., scions of 'Cornish Aromatic' apple. From Mr. A. S. Banks, Waterville, N.S., scions of 'Black Ben Davis,' and 'Apple of Commerce.' From Mr. Wm. Sangster, Falmouth, N.S., two trees of 'Stark' apples. From Stark Bros., Louisiana, Mo., ten varieties of peach trees.

I addressed several agricultural meetings in Nova Scotia and New Brunswick during the year; also a series of two weeks' institute meetings in Prince Edward Island, from February 17 until March 3.

## HEDGES.

In the spring of 1896 twenty-three different kinds of hedges were planted. The plants were from 6 to 8 inches high, and were set 18 inches apart, in rows 50 feet long, The hedges were placed ten feet apart, and have been trimmed more or less every year. This is done once about the last of June to head in rank growing shoots, but the principal clipping is done the last of July or early in August.

The system of clipping adopted here with deciduous hedges is to produce rounded top and sides, and this has given satisfactory results. Where the sides are clipped square with almost a square top, as is sometimes seen, hedges so treated usually have many dead bottom branches.

In pruning the evergreen hedges, the aim is to give a gradual rounding from the top to the ground, giving the tips of all branches access to sunlight and rainfall, which doubtless aids their proper development, and in this way well grown vigorous branches to the bottom are usually obtained. Severe clipping when the hedges are young is not necessary, but some trimming should be done every year.

Sometimes hedges are planted with two rows, 8 or or 10 inches apart. This does not appear to be necessary, as one row of plants 18 inches apart will give excellent results. Plants not more than 18 inches high, well branched to the bottom, are the best. The common spruce makes one of the best and most easily obtained hedges, and no prettier hedge can be had if kept in proper shape. The Amur Privet, *Ligustrum amurense,* is one of the best of the deciduous hedges tested here. The Ginnalian maple is a stronger and quicker growing hedge; but it requires more clipping to keep it in shape.

EVERGREEN HEDGES.

| Name of Variety. | Present height of hedge. | Present width of hedge at bottom. | Character of Hedge. |
|---|---|---|---|
| | Feet. | Feet. | |
| *Thuya occidentalis*, common Arbor vitæ or White Cedar | 2½ | 3¼ | Good. |
| *Picea nigra*, Common Black Spruce | 2¾ | 3 | " |
| *Picea excelsa*, Norway Spruce | 3½ | 4 | " |
| *Picea pungens*, Rocky Mountain Blue Spruce | 2½ | 2¾ | " |
| *Pinus Cembra*, Swiss Stone Pine | 2¾ | 2½ | Fair. |
| *Pseudotsuga Douglasii*, Douglas Fir | 3½ | 3¼ | Good. |
| DECIDUOUS HEDGES. | | | |
| *Ligustrum amurense*, Amur Privet | 3¾ | 5½ | Good. |
| *Rhamnus cathartica*, Common Buckthorn | 3¼ | 4 | " |
| *Acer tataricum Ginnala*, Ginnalian Maple | 5¼ | 6 | " |
| *Acer glabrum*, Smooth Western Maple | 3 | 3 | Very poor. |
| *Cotoneaster acutifolia*, Sharp-leaved Cotoneaster | 3 | 3¼ | Fair. |
| *Cotoneaster integerrima*, Common Cotoneaster | 2½ | 3½ | " |
| *Berberis Thunbergii*, Thunberg's Barberry | 2¾ | 4 | Good. |
| *Rosa rubrifolia*, Purple-leaved Rose | 4¾ | 3 | Very poor. |
| *Berberis Vulgaris purpurea*, Purple-leaved Barberry | 2¾ | 2¾ | Fair. |
| *Lonicera tatarica*, Tartarian Honeysuckle | 4 | 4 | " |
| *Caragana arborescens*, Siberian Pea tree | 3 | 3 | " |
| *Caragana frutesens*, Woody Caragana | 2½ | 2¼ | " |
| *Viburnum Lantana*, Wayfaring Tree | 2¾ | 2¾ | " |
| *Syringa vulgaris*, Charles X. seedling lilac | 4 | 3½ | " |
| *Spiræa Van Houttei*, Van Houtte's Spiræa | 3 | 3½ | " |
| *Neillia opulifolia aurea*, Golden-leaved Nine bark | 3½ | 4 | " |
| *Neillia opulifolia*, Nine Bark | 4¾ | 5¼ | " |

## ANNUAL FLOWERING PLANTS.

The object in growing a number of annual flowering plants is to beautify the grounds, and to obtain information as to their relative value for bedding, massing, or mixed planting. Some bedding work is done, but the majority of the flowers are grown in masses in beds, 3 by 12 feet. These are easily kept weeded, and one-half of each bed is usually given to a variety. The plants grown are generally of mixed colours, and little attention has thus far been devoted to varieties in special colours. The mixed will be found to give general satisfaction, and the best strains obtainable of the different kinds are used.

A large number of annuals will start easily in the open ground, but for early bloom those grown in the hot-bed and once transplanted there to develop stocky, well rooted plants, will be found the most satisfactory. The difficulty in sowing the seed in the open ground is to get the young plants started early enough. The seed generally is sown shallow, and a few dry days will thoroughly dry out the surface soil. In some instances careful and frequent watering is needed; very dry weather is also unfavourable for transplanting. This year strawberry boxes were used to shade the plants for a few days until they were rooted. The show of flowers was good this season, and the selection an excellent one, containing many new and interesting things.

## LIST OF ANNUAL FLOWERS GROWN AT NAPPAN.

Propagated in hot-beds, grown March 15: transplanted into shallow boxes about April 15 and put out in open ground May 15.

Asters (12 varieties)—Flowered profusely and made an excellent display.

*Ageratum coyzoides.*—Made a nice show with its brush-like blue flowers.

*Amarantus superbus.*—Gave excellent results.

*Brachycoma ibcridifolia,*—A graceful plant; fine for edging, flowered abundantly,

*Chrysanthemum coronarium, Chrysanthemum carinatum tricolor, Chrysanthemum aureum.*—These all flower freely and are very attractive. *C. aureum* is an excellent border plant.

*Celosia plumosa, Celosia plumosa superba, Celosia plumosa* (dwarf).—All good varieties; flowered freely; very useful for bedding.

*Dianthus chinensis, Dianthus Heddewiggii, Dianthus laciniatus, Dianthus diadematus, Dianthus imperalis.*—All good sorts; produce flowers in great variety of form and colour in great abundance. In bloom from early in August to frost.

*Gaillardia picta, Gaillardia picta Lorenziana.*—Produce brilliant flowers in great abundance.

*Lobelia erinus* (Crystal Palace).—Valuable for bedding and edging.

*Antirrhinum majus, Antirrhinum majus manum, Antirrhinum* (Tom Thumb).—Beautiful free flowering varieties of Snapdragon.

*Nicotiana affinis, Nicotiana colossea, Nicotiana sylvestris.*—Free blooming and effective, especially in large beds.

*Phlox Drummondii* (many varieties).—Excellent for bedding; free bloomers with a wide range of attractive colours.

*Petunias* (many sorts, single and double).—Very showy flowers, abundant bloomers, useful for bedding.

*Portulaca grandiflora.*—Produces brilliant flowers in great abundance.

*Pansies* (many varieties.)—Flower most freely, make an excellent display.

*Stocks* (many varieties).—Give fine flowers; useful for bedding.

*Verbenas* (in great variety).—Profuse bloomers, very pretty.

*Zinnias.*—Showy annuals; flowers purple and orange.

## LIST OF ANNUAL FLOWERS GROWN AT NAPPAN.

### SOWN IN THE OPEN GROUND ABOUT MAY 15.

*China Asters, 12 varieties.*—Made a fine show in the autumn.

*Abronia umbellata.*—In bloom August 6. A handsome trailing plant.

*Agrostemma cœli rosea*—In bloom last of July. Bloomed well.

*Amarantus superbus.*—Flowered freely in the autumn.

*Alyssum Little Gem.*—Succeeds well; a fine border plant.

*Bartonia aurea.*—In bloom July 18 to September 8; made a fine show.

*Cacalia coccinea.*—Produces scarlet flowers in abundance.

*Cacalia lutea.*—An orange flowered sort; very desirable.

*Calendula officinalis (Royal Trianon.)*—In bloom July 24; flowers very fine and abundant.

*Coreopsis tinctoria, Coreopsis Drummondii, Coreopsis Atkinsoniana.*—Very showy. Flowers bright yellow; produced in abundance from last of July to frost.

*Iberis coronaria, Iberis odorata, Iberis umbellata.*—Plants useful for bedding; bloom freely from July 18 until frost.

*Centaurea cyanus, Centaurca moschata, Centaurea alba.*—All bloom well from July 18 until late in autumn. Make a fine display.

*Godetia rubicunda splendens, Godetia Whitneyi.*—Produce showy flowers of a satin-like texture, beginning July 20.

*Eschscholtzia californica, Eschscholtzia mandarin, Eschscholtzia Douglasi.*—Known as California Poppies; remarkable for the abundance and brilliance of their flowers.

*Gypsophila elegans, Gypsophila elegans rosea.*—Produces small flowers in abundance, valuable for bouquets.

*Helichrysum bracteatum.*—Everlasting flowers; very desirable.

*Helianthus multiflorus fl. pl., Helianthus cucumeri folius Stella.*—Produce showy bright yellow flowers in abundance.

*Larkspur hyacinth-flowered, Larkspur ranunculus-flowered, Larkspur candelabrum, Larkspur Emperor.*—These different forms of larkspur are all desirable. They vary in height and colour, but are free bloomers and very ornamental.

*Lupinus sulphureus, Lupinus hybridus fl. pl. Lupinus nanus fl. albus, Lupinus nanus albo coccinea.*—Different forms of Lupin, producing in August large spikes of flowers of different colours.

*Nigella damascena.*—Produces interesting and attractive flowers..

*Papaver somniferum, Papaver Rhoeas, Papaver carnation-flowered, French Shirley.*—All desirable forms of Poppy; very free bloomers, with a wide range of colours.

*Scabious major, Scabious major dwf.*—Produce flowers in great abundance.

*Salpiglossis var. grandiflora, Salpiglossis var. superbissimus.*—Both very fine varieties and free bloomers.

*Tagetes signata pumila.*—A very fine bloomer, good for massing.

## GARDEN VEGETABLES.

### EXPERIMENTS WITH GARDEN PEASE.

Comparative tests have been carried on for a number of years with varieties of garden peas obtained from different seedsmen. This season eighty-two sorts were under test including many of the newer sorts advertised. The information obtained from these tests has been reported from time to time, and varieties considered of less value than others have been discarded. This season fifty sorts have been thought not worthy of further test, and a table of those kinds found to be the best is given below.

The seed was sown in rows 3 feet apart, and 33 feet long. No stakes or brush was used as support to the vines, they being allowed to spread between the rows. Two rows, each 33 feet long, were planted of each variety—one row was allowed to ripen for seed, and the other was picked when fit for eating green, and the weight of unshelled pods fit for market obtained. The seed was sown May 4, in drills 2 inches deep, 1½ inches apart.

The ground was previously in corn, having been manured for that crop in the spring of 1902. Complete commercial fertilizer, at the rate of 100 lbs. per acre, was scattered along the rows at time of planting. The land was well worked up before seeding, and the rows were kept cultivated and hoed until the first of July, after which on account of the vines covering the ground it could not be worked.

Peas can be grown in almost any kind of soil, but for the best results a fairly rich loam should be selected. The pea plant likes a cool moist soil, and can be planted as early in the spring as the land is fit to work. No gain, however, is made by planting on ground that has been worked before it is dry enough.

The wrinkled sorts of peas are generally better in quality than the smooth, round kinds, but the majority of very early peas put upon the market are of the latter character. The Alaska, or green smooth pea, and Station, a green wrinkled variety, are the two best very early peas to grow. They are as early and as good croppers as any of the very early sorts tested. They are not large podded, as, in fact, none of the very early sorts are. Following these as market sorts are, Prosperity, or Gradus, Thomas Saxton and King Edward VII., all about the same class and coming in at the same time. These are practically of the same season as Nott's Excelsior and American Wonder, but have much larger pods. We could not see any difference between Thomas Saxton and King Edward VII. pea. These varieties can be safely recommended for either home use or market purposes, surpassing in vigor and productiveness either the Gradus or Prosperity, and if anything a little earlier.

GARDEN PEASE.

| Name of Variety. | When First Fit to Use. | Date of Last Picking. | Length of Vine. | Length of Pods. | Number of Peas in Pod. | Size of Pea. | Kind of Pea. | Total weight of marketable peas in pod. |
|---|---|---|---|---|---|---|---|---|
| | | | in. | in. | | | | lbs. |
| Alaska........ ........ | July 15.. | July 30.. | 36 | 2½ to 3 | 6 to 7 | Small .... | Smooth..... | 28 |
| Station...... ..... ..... | " 15.. | " 30.. | 38 | 2¾ " 3 | 6 " 7 | " .... | Wrinkled... | 28 |
| Surprise................ | " 15.. | " 30.. | 37 | 2½ " 3 | 6 " 7 | " .... | " ... | 23 |
| First of All ............ | " 15.. | " 30.. | 40 | 2½ " 3 | 6 " 7 | " .... | Smooth..... | 21 |
| Claudit......... ...... | " 21.. | Aug. 4.. | 42 | 3 " 3½ | 6 " 8 | Medium . | " .... | 21½ |
| Exonian....... ......... | " 21.. | " 4.. | 42 | 2¾ " 3 | 6 " 7 | " .. | Wrinkled... | 26 |
| Ameer................ | " 21.. | " 4.. | 37 | 3 " 3½ | 6 " 8 | Large ... | Smooth.... | 19¾ |
| Prosperity........ ...... | " 21.. | " 6.. | 43 | 3½ " 4 | 6 " 8 | " .... | Wrinkled... | 25½ |
| Thos. Saxton... ........ | " 21.. | " 4.. | 47 | 3¼ " 4 | 6 " 8 | " .... | " ... | 32¼ |
| King Edward VII...... | " 21.. | " 4.. | 47 | 3¼ " 4 | 6 " 8 | " .... | " ... | 31¼ |
| Gradus.. .. .. .......... | " 21.. | " 6.. | 43 | 3½ " 4 | 6 " 8 | " .... | " ... | 22½ |
| A 1. .................. | " 21.. | " 6.. | 42 | 3¼ " 3¾ | 6 " 7 | " .... | " ... | 23½ |
| American Wonder....... | " 21 . | " 6.. | 28 | 2¾ " 3 | 5 " 7 | Medium.. | " ... | 23½ |
| Nott's Excelsior......... | " 21.. | " 6.. | 22 | 2½ " 2¾ | 5 " 7 | " .. | " ... | 23½ |
| Juno.................... | Aug. 3.. | " 13.. | 30 | 3½ " 4 | 7 " 8 | Large .... | " ... | 27½ |
| Hurst's Reliance......... | " 3.. | " 8.. | 46 | 3 " 3¼ | 5 " 7 | " .... | " ... | 30¼ |
| Dwarf Defiance......... | " 3.. | " 8 . | 20 | 3½ " 4½ | 7 " 9 | " .... | " ... | 25½ |
| Advancer. ............ | " 3.. | " 13.. | 48 | 2¾ " 3 | 6 " 7 | Medium.. | " ... | 32 |
| Daisy......... .. ...... | " 3.. | " 13.. | 20 | 3¼ " 4 | 6 " 8 | Large .... | " ... | 35½ |
| Prolific... ...... ...... | " 3.. | " 13.. | 36 | 3½ " 4½ | 7 " 9 | " .... | " ... | 37 |
| Admiral Dewey......... | " 3.. | " 13.. | 40 | 3½ " 4½ | 7 " 9 | " .... | " ... | 40¼ |
| American Champion..... | " 3.. | " 13.. | 54 | 3½ " 4 | 7 " 8 | " .... | " ... | 27½ |
| Prince Edward.......... | " 3.. | " 13.. | 54 | 3¾ " 4¾ | 7 " 9 | " .... | " ... | 27½ |
| Dwarf Telephone........ | " 3.. | " 18.. | 24 | 3 " 3½ | 6 " 8 | " .. . | " ... | 26½ |
| Prodigious .......... .. | " 10.. | " 18.. | 52 | 3¾ " 4½ | 7 " 9 | " .... | " ... | 39½ |
| Fillbasket . ............ | " 10.. | " 25.. | 48 | 3¾ " 4½ | 7 " 9 | " .... | " ... | 33¼ |
| Perfection. ............ | " 10.. | " 28.. | 52 | 3½ " 4½ | 7 " 9 | " .... | " ... | 22½ |
| Heroine .......... ..... | " 10.. | " 20.. | 53 | 3¾ " 4½ | 7 " 9 | " .... | " ... | 39¾ |
| Duke of Albany......... | " 10.. | " 25.. | 50 | 3 " 3¾ | 6 " 7 | " .... | " ... | 39¾ |
| Stratagem.............. | " 10.. | " 25.. | 49 | 3 " 3¾ | 7 " 8 | " .... | " ... | 34 |
| Stanley........ ........ | " 10.. | " 25.. | 52 | 4 " 4½ | 7 " 9 | " .... | " ... | 26¾ |
| Perpetual.... .......... | " 10.. | " 30.. | 49 | 3 " 3¾ | 5 " 7 | " .... | " ... | 38 |

## EXPERIMENTS WITH TOMATOES.

Seventy-one varieties were included in this comparative test. The seed was sown April 7, in boxes 3 inches deep with 2½ inches of soil. These boxes were set on a hot-bed having a moderate heat. The plants did not make a rapid growth, but strong, vigorous plants were ready for pricking out; one plant in a strawberry box filled with fairly rich garden soil, on April 27. These boxes were set closely together in a hot-bed having moderate heat, and having about 2 inches of sand over the manure.

These plants were carefully watched, giving a judicious amount of water, and allowing plenty of ventilation on warm days. The boxes were moved in the hot-bed once a week to prevent the roots of the plants from fastening on the manure below the boxes, for the roots will quickly penetrate into it through the openings in the boxes.

It is not well to force the plants too much in the hot-bed, but a moderate, continuous growth is important. To be the most successful, this character of growth should be maintained if practicable, without check from the time the plants are started until the fruit is ripe. Before planting out, the sash was left off the plants as much as possible, this making them hardy and more stocky. The tomato requires a uniformity of heat and moisture to develop properly. There is usually no gain in setting the plants in the open ground before towards the middle of June. This year, however, the soil was fairly warm, and weather conditions favourable, and they were put out June 10. The boxes were cut, and the plants set with the earth attached. They were set on the level and not mounded up.

Usually it is not necessary to water the plants when they are planted this way, but this season a drying wind with exceptionally dry soil made it necessary to water once. This was done by making the soil cup-shaped around the plant to hold the water, and pouring about a quart around each plant. After the water had been soaked up well, dry earth was put around each plant to conserve the moisture by preventing evaporation. Out of the 400 plants set none were lost. Although the season kept dry it was not found necessary to water again.

The practice followed by some of keeping the soil around the plants soaked with water, is not good, as an excess of water and lack of heat checks the growth of the plants very materially.

The plants when set were from 8 to 10 inches high, and some of them were in blossom. A lath was driven into the ground by each plant, to which it was tied. The lateral branches were kept cut off as they appeared, and the plant trained to the stake, allowing only one stalk to grow. Each plant was tied to the stake three times as they grew, and each plant was about 4 feet high at the end of the season.

This method gives more perfect fruit which ripens earlier than where the plants are allowed to run untrained over the ground; but, the yield of fruit is not so large. Five plants of six varieties were allowed to grow without stakes to compare with five similar plants of the same variety staked. Those trained were not affected with rot nearly so much as those not staked, and there was a much larger percentage of perfect marketable fruit. The unstaked plants require more room, and should be set 4 by 4 feet apart each way, while those staked can be set 30 inches apart each way.

The practice followed by some is to let the vines grow until about the first of August, when three stakes each about 3 feet long are set pyramid shape over the plant, and tied at the top. The vines are gathered together and tied with binder twine to the top of these stakes. This keeps the fruit from the ground and prevents so much dampness around the fruit, thereby materially lessening the loss of fruit from rot.

Sufficient cultivation and hoeing was given to keep the ground in a loose condition. The land had not been manured since the spring of 1901, and had tomatoes on it in 1902. The usual practice is to grow tomatoes where the previous crop has been manured, and not use stable manure directly for the crop, as it is apt to produce too rank a growth in the plant. The soil on which these plants were grown was a light clay loam, not very fertile, and potato fertilizer at the rate of 300 lbs. per acre was sown broadcast and harrowed before planting. In addition to this, one teaspoonful of nitrate of soda was scattered around each plant on June 26 before a rain, and a similar amount on July 14. This quantity of nitrate of soda will be found sufficient to give the plant a good start.

The object of the experiment was to find out which kinds are earliest maturing and best for market purpose. The requirement of the market is for an even, round fruit, not too small. The varieties found best were Sparks Earliana, a scarlet, medium-sized round, smooth tomato; Bond's Early Minnesota, a smooth purplish pink, medium-sized tomato; Early Ruby, medium, quite smooth, scarlet, and Extra Early Advance, medium, smooth, scarlet.

The season being short at best for tomatoes in the maritime provinces, earliness is of great importance. Any fruit that will mature at Nappan is likely to mature in almost any part of the maritime provinces, if given similar treatment.

Five plants of a variety were planted in each plot, and the following yield of ripe and green fruit was obtained. For fear of frost, all unpicked fruit was gathered September 21.

TOMATOES.

| Name of Variety. | Sept. 4. | Sept 14. | Sept. 21. | | Total Ripe Fruit from 5 Plants. | Total Green Fruit from 5 Plants. | Character of Fruit. |
|---|---|---|---|---|---|---|---|
| | Ripe Fruit from 5 Plants. | Ripe Fruit from 5 Plants. | Ripe Fruit from 5 Plants. | Green Fruit from 5 Plants. | | | |
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | |
| Autocrat | 3½ | 4 | 1½ | 5 | 9 | 14 | Smooth. |
| Atlantic Prize | 4 | 2¾ | 2½ | 6¼ | 9¼ | 15½ | Medium smooth. |
| Acme | 8¾ | 3½ | 4 | 10¼ | 16¾ | 27 | Smooth. |
| Acme—Improved | 5¾ | 11¾ | ¾ | 7¾ | 18¼ | 26 | " |
| Brinton's Best | 1½ | 3½ | 4 | 12½ | 9 | 21½ | " |
| Bright and Early | 2 | 4 | 1 | 7 | 7 | 14 | " |
| Baltimore Prize Taker | 1¾ | 3¼ | 4 | 11¼ | 9 | 20¼ | " |
| Bolgiano's Best | ½ | 2½ | 3 | 8¼ | 6 | 14¼ | " |
| Best of All | ½ | 4 | 2¾ | 15 | 7¼ | 22¼ | " |
| Crimson Cushion | 1¼ | 4 | 8 | 13 | 13¼ | 26¼ | Medium smooth. |
| Century | 3 | 3 | 5¼ | 11¾ | 11¼ | 23 | Smooth. |
| Comrade | 8¼ | 5¾ | 2½ | 13¼ | 11½ | 24¾ | Medium smooth. |
| Combination | 3¾ | 3 | 5 | 11¼ | 11¾ | 23 | Smooth. |
| Climax | 2¼ | 8½ | 3½ | 8 | 14¼ | 22¼ | " |
| Canada | 1½ | 2½ | 3¼ | 19¾ | 7¼ | 27 | Medium smooth. |
| Cream City | 2 | 5½ | ½ | 11 | 8 | 19 | Smooth. |
| Democrat | 1¼ | 3 | 2 | 6¼ | 6¼ | 12½ | " |
| Dominion Day | 3½ | 12¼ | 1½ | 8 | 17¼ | 25¼ | Medium smooth. |
| Diadem | 1¾ | 3½ | 3½ | 10½ | 8¾ | 19¼ | Smooth. |
| Dwarf Champion | ¾ | 2½ | 3 | 12¼ | 6¼ | 18½ | " |
| Earliana | 5½ | 4 | 2 | 12 | 11½ | 23½ | " |
| Early Minnesota | 1½ | 2¼ | 6 | 10 | 9¾ | 19¾ | " |
| Extra Early Advance | 6 | 13¾ | 1½ | 9¾ | 21¼ | 31 | " |
| Enormous | ........ | 4 | 2¼ | 8 | 6¼ | 14¼ | Medium smooth. |
| Early Richmond | 4¾ | 11½ | 5½ | 7 | 21¾ | 28¾ | Rough. |
| Early Leader | 8 | 2½ | 6 | 8½ | 16½ | 25 | " |
| Early Jersey | 4½ | 7½ | 3¾ | 12 | 15¾ | 27¾ | " |
| Early Jewel | 3 | 4 | 2 | 8½ | 9 | 17½ | Smooth. |
| Early Ruby | 4 | 4 | 9 | 14 | 17 | 31 | Medium smooth. |
| Essex Hybrid | 2¾ | 2½ | 2 | 8¾ | 7¼ | 16 | " |
| Earliest-Maule | 1¼ | 4½ | 1 | 16¾ | 6¾ | 23¼ | " |
| Early Bermuda | 2¼ | 5½ | 3 | 9 | 10¾ | 19¾ | " |
| Favourite | 4 | 2½ | 1¾ | 10¾ | 8¼ | 19 | Smooth. |
| Frogmore | 2¾ | 4½ | 3 | 16½ | 10¼ | 26¾ | " |
| Fordhook First | 2¾ | 6 | 1½ | 5½ | 10¼ | 15¾ | " |
| Freedom | ¾ | 4 | ½ | 9¼ | 5¼ | 15 | Medium smooth. |
| Fordhook Fancy | 1¾ | 2¼ | 3¼ | 7¾ | 7¼ | 15 | Smooth. |
| Creekside Glory | 2½ | 5½ | 5½ | 14¼ | 13½ | 27¾ | Medium smooth. |
| Garden Sowing | 1¾ | 2 | 1 | 11 | 4¾ | 15¾ | Smooth. |
| Golden Jubilee | 3¼ | 5½ | 3 | 15 | 11¾ | 26¾ | Medium smooth. |
| Great Mississippi | 4¾ | 7½ | 4½ | 9½ | 16¾ | 26¼ | Medium smooth. |
| Honor Bright | 1½ | 6½ | 3¾ | 8 | 11¾ | 19¾ | Smooth. |
| Ignotum | 1 | 3½ | 3¾ | 17¾ | 8¼ | 26 | " |
| King Humbert | ½ | 2 | 6 | 14 | 8½ | 22½ | Medium smooth. |
| Long-keeper | 4 | 5½ | 2 | 12 | 11½ | 23½ | " |
| Lorillard | 3¾ | 3 | 5 | 11¼ | 11¾ | 23 | Smooth. |
| Landreth's Earliest | 3 | 3¼ | 4½ | 6¼ | 10¾ | 17 | Medium smooth. |
| Livingston's Stone | 3½ | 2½ | 4½ | 13½ | 10½ | 24 | Smooth. |
| Maule's—No name | ........ | 4½ | 5¾ | 16¾ | 10¼ | 27 | Medium smooth. |
| Marvel | 1 | 5½ | 3 | 8¼ | 9½ | 17¾ | Smooth. |
| Magnus | 2¼ | 5½ | 1¼ | 6½ | 9 | 15½ | Medium smooth. |
| Matchless | ½ | 2¼ | 2 | 18 | 4¾ | 22¾ | Smooth. |

TOMATOES—*Concluded.*

| Name of Variety. | Sept. 4. | Sept. 14. | Sept. 21. | | Total Ripe Fruit from 5 Plants. | Total Green Fruit from 5 Plants. | Character of Fruit. |
|---|---|---|---|---|---|---|---|
| | Ripe Fruit from 5 Plants. | Ripe Fruit from 5 Plants. | Ripe Fruit from 5 Plants. | Green Fruit from 5 Plants. | | | |
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | |
| New Imperial.......... | 2 | 2¾ | 2 | 16½ | 6¾ | 23¼ | Smooth. |
| Nolte's Earliest ... ... | 5 | 9¼ | 2 | 4 | 16¼ | 20¼ | " |
| New Buckeye State.... | ......... | 1¾ | 2½ | 12¾ | 4¼ | 16¾ | " |
| New Liberty Bell .. ... | 2 | 5 | 4¼ | 11 | 11¼ | 22¼ | Medium smooth. |
| Plentiful...... ....... | 4 | 4½ | 2½ | 14 | 11 | 25 | " |
| Ponderosa.... ... ..... | 2½ | 5 | 4½ | 11¼ | 12 | 23¼ | " |
| Perfection.. .......... | 1¼ | 3 | 3 | 9½ | 7¼ | 16¾ | Smooth. |
| Picture Rock.... .... | ¾ | 4½ | 7 | 11½ | 12¼ | 23¾ | " |
| Quick-sure......... .. | 4 | 2¾ | 3 | 7¾ | 9¾ | 17½ | " |
| Quarter Century ....... | 1¼ | 5½ | 2¾ | 5 | 19½ | 24½ | " |
| Royal Red.......... ... | 5½ | 9¼ | 1½ | 5 | 16¼ | 21¼ | " |
| South Jersey..... ... | 7½ | 1½ | 4 | 7 | 13 | 20 | Medium smooth. |
| Success ...... ........ | ½ | 2 | 2¼ | 15¼ | 4¾ | 20 | Smooth. |
| Spark's Earliana . ..... | 8¾ | 3 | 1½ | 10 | 13¼ | 23¼ | " |
| Simmer's Earliest ...... | 3¼ | 14¾ | 1 | 4 | 19 | 23 | Medium smooth. |
| Thorburn's Earliest..... | 2½ | 3¼ | 6¼ | 12 | 12 | 24 | " |
| Table Queen .......... | 3¼ | 7 | 9 | 18 | 19¼ | 37¼ | Smooth. |
| Thorburn's 1902........ | 1 | 5½ | 3 | 14 | 9 | 23 | Medium smooth. |
| Waldorf ......... .... | 1½ | 1½ | 4¼ | 9 | 7¼ | 16¼ | Smooth. |

TOMATOES Staked compared with those not Staked.

| Number. | Name of Variety. | Ripe Fruit from 5 Plants.—Sept. 4. | Total Ripe Fruit from 5 Plants, Sept. 21. | Total Green Fruit from 5 Plants. | Total Fruit from 5 Plants. |
|---|---|---|---|---|---|
| | | Lbs. | Lbs. | Lbs. | Lbs. |
| 1 | Brinton's Best—Not staked............ .. ............ | 2½ | 8 | 27½ | 35½ |
| 2 | " Staked ..... .. ..................... | 1½ | 9 | 12½ | 21½ |
| 3 | Early Leader—Not staked. . .. ......................... | 4 | 14½ | 26 | 40½ |
| 4 | " Staked..... ........... ............... | 8 | 16½ | 8½ | 25 |
| 5 | Early Ruby—Not staked ....... ....... ... .... ... | 6¾ | 13¼ | 24 | 37¼ |
| 6 | " Staked ...... . ..... .... .... ........ | 4 | 17 | 14 | 31 |

## EXPERIMENTS WITH GARDEN CORN.

Forty-five varieties of garden corn were planted May 28 on a clay loam soil. This land was previously in strawberries. No stable manure was used this season. The land was ploughed and worked up a few days before planting. Complete fertilizer, at the rate of 350 pounds per acre, was sown broadcast and harrowed in with the smoothing harrow. The corn was planted in rows three feet apart, and three kernels of corn planted in a group a foot apart and 1½ inches deep.

Each plot was two rows 16½ feet long. The corn was thinned to one plant to a foot by cutting out the weakest plants. It is better to thin by cutting off the plant than to pull it up, for by pulling, the remaining plant is liable to be disturbed. The season was not favourable for this crop, and many of the varieties did not mature sufficiently for table use. The following notes were taken of these varieties :—

CORN.

| Name of Variety. | Length of Ears. | Size of Ears. | Remarks. |
|---|---|---|---|
| | Inches. | | |
| Extra Early Beverly | 5 to 6 | Small to medium | All fit for table use. |
| Peep O'Day | 5 " 6 | " " | " " |
| Extra Early Cory | 5 " 7 | Medium | 90 p. c. fit for table use. |
| Red Cob Cory | 5 " 7 | " | 90 " " |
| Ringleader | 5 " 6 | " | 90 " " |
| Eastern Extra Early | 4 " 5 | Small | 80 " " |
| Ford's Early Sugar | 5 " 6 | " | 80 " " |
| Tom Thumb | 5 " 7 | " | 30 " " |
| Burbank's Early Maine | 5 " 6 | " | 80 " " |
| Fuller's Early Yellow | 7 " 10 | Medium | 80 " " |
| Vick's Extra Early | 6 " 7 | Medium to large | 80 " " |
| Crosby's Early | 5 " 7 | Medium | 60 " " |
| Early Six Weeks | 3 " 4 | Small | 50 " " |
| Extra Early Premo | 6 " 7 | Large | 40 " " |
| Oakview | 6 " 7 | Medium to large | 40 " " |
| Extra Early Minnesota | 7 " 8 | Large | 40 " " |
| Early Adams | 6 " 7 | " | 40 " " |
| Mammoth White Cory | 7 " 8 | " | 30 " " |
| New Champion | 7 " 8 | " | 10 " " |
| Golden Bantam | 4 " 6 | Small | 10 " " |
| Metropolitan | 6 " 8 | Large | 10 " " |
| Nelson's Yellow | 8 " 9 | Medium | 10 " " |
| Cosmopolitan | 6½ " 8 | Large | 10 " " |
| Early Essex | 6 " 8 | " | 10 " " |
| Kendall's Early Giant | 6 " 7 | " | 5 " " |
| Stabler's Extra Early | 7 " 8 | " | 5 " " |
| Honey Dew | 6 " 8 | " | 5 " " |

None of the following produced any heads fit for table use:—

Ne Plus Ultra, Potter's Excelsior, None Such, Earliest Sheffield, Marblehead Mammoth, Burlington Hybrid, Henderson, Landreth's Sugar, Lackey's Early, Quincy Market, Hickox Improved, Perry's Hybrid, Old Colony, Early Landreth Market, Early Concord, Early Amber Pop Corn, White Rice Pop Corn, White Pearl Pop Corn.

## EXPERIMENTS WITH CABBAGE.

The seed was sown in shallow boxes April 3. The boxes were placed in a cold frame. This cold bed was earth two feet deep put into a frame set on the ground. The bed was used for a hot-bed the previous season, and was covered during the winter, and about March 1 glass sashes were put on it, and by April 1 the soil was all thawed out and quite warm.

The seed germinated slowly, but the plants were stocky and strong. They were fit to prick out April 27. They were set 3 by 3 inches apart into the cold frame bed, and by setting out time, May 19, were good, strong, healthy plants, well rooted. Twenty-five plants of a variety were planted, but the ravages of the root Maggot made it necessary to reduce the selection to 15 plants of each variety for the test.

The ground on which these were planted was manured in the fall of 1902 with 20 one-horse cart loads of stable manure per acre and ploughed. This was ploughed again in the spring and worked up, and 300 pounds of complete fertilizer per acre sown broadcast and harrowed in with the smoothing harrow. On June 15 a teaspoonful of nitrate of soda was scattered around each plant. The plants were set in rows three feet apart and thirty inches apart in the rows on level ground.

The cabbage thrives in a cool, moist atmosphere. The failure of plants to head is seldom experienced in these provinces. This condition is usually the result of very hot weather and a dry atmosphere, which we are not generally subjected to. The cabbage plant is a gross feeder, and if well supplied with food and a proper supply of moisture will generally succeed on any kind of soil. Unlike the tomato, it can be set out as early in the spring as the soil will permit of working properly; that is, providing the plants have been started under good conditions. If the plants have been forced in a green-house and set out May 1 a frost of over three degrees is liable to injure them, while if grown under cool conditions and well hardened up before planting, they will stand any spring frosts to which they are likely to be exposed after May 1. If the plants are to be set out before the middle of May they must be started early enough to make strong and well rooted plants by that time.

The object of this experiment was to find out what sorts are best for early market. The heads were cut as soon as fit for market and the weights obtained. Forty-six varieties were included in this test.

CABBAGE

| Name of Variety. | July 31. | | Aug. 8. | | Aug. 12. | | Aug. 19. | | Aug. 28. | | Average weight of Heads, lbs. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. of Heads. | Lbs. | No. of Heads. | Lbs. | No. of Heads. | Lbs. | No. of Heads. | Lbs. | No. of Heads. | Lbs. | | |
| Gregory's Earliest | 3 | 6¾ | 7 | 18¾ | 4 | 13½ | 1 | 4½ | .... | .... | 2·90 | Conical. |
| Earliest | 4 | 9¾ | 3 | 8 | 3 | 10¼ | 4 | 11½ | 1 | 2½ | 2·80 | " |
| Jersey Wakefield | 4 | 8½ | 6 | 16 | 5 | 23 | .... | .... | .... | .... | 3·16 | " |
| Paris Market | 5 | 11¼ | 7 | 15½ | .... | ... | 3 | 6½ | .... | .... | 2·21 | " |
| Early Express | 5 | 12¾ | 4 | 13½ | 3 | 10¼ | 3 | 10 | .... | ... | 3·10 | " |
| Miniature Marrow | 3 | 4¼ | 8 | 13 | 4 | 6 | .... | ... | .... | .... | 1·55 | Round. |
| Cracker Jack | 3 | 8½ | 5 | 13¾ | 2 | 7 | 3 | 7 | 2 | 4½ | 2·71 | Conical. |
| Charleston | 1 | 3½ | 3 | 9¾ | 6 | 19 | 2 | 6½ | 3 | 10¼ | 3·26 | " |
| Early Baseball | 2 | 4½ | 5 | 9¾ | 4 | 9½ | 4 | 10 | .... | .... | 2·23 | Round. |
| Etampes | 7 | 14 | 4 | 7¾ | 4 | 9 | .... | .... | .... | .... | 2·05 | Conical. |
| Bamberg's Earliest | 1 | 2½ | 3 | 8 | 3 | 8½ | 4 | 15 | 4 | 9¼ | 2·88 | Round, not compact. |
| Premier | .... | .... | .... | .... | 3 | 14½ | 12 | 51½ | .... | ... | 4·40 | Flat, round. |
| Early Eureka | .... | .... | 3 | 10 | 4 | 10½ | 5 | 20 | 3 | 15 | 3·70 | " |
| Early Dwarf York | 1 | 2¼ | .... | .... | 4 | 14½ | 7 | 22 | 3 | 9 | 3·25 | " |
| Improved Early Spring | .... | .... | .... | .... | 6 | 19 | 6 | 22¼ | 3 | 12 | 3·58 | " |
| Early Spring | .... | .... | .... | .... | 6 | 21 | 5 | 21½ | 4 | 17 | 3·96 | " |
| Winningstadt | .... | .... | ... | .... | 6 | 18½ | 4 | 15 | 5 | 19¾ | 3·55 | Conical. |
| Early Summer | .... | .. | 3 | 9 | 4 | 18 | 5 | 19¾ | 3 | 10¼ | 3·80 | Round. |
| First Early | ... | .... | .. | .... | 6 | 23¾ | 6 | 22 | 3 | 11¾ | 3·83 | " |
| | Aug. 19. | | Aug. 28. | | Sept. 2. | | Sept. 10. | | Sept. 14. | | | |
| Taber's Nonpareil | 5 | 14½ | 5 | 17¾ | 3 | 10 | 2 | 7¾ | .. | .... | 3·33 | " |
| Bismarck | 2 | 11 | 1 | 4¾ | 4 | 19¼ | 4 | 31 | 4 | 22 | 5·90 | Flat, round. |
| Reedland Early Drumhead | 6 | 28 | 6 | 18¼ | .. | ... | .... | .... | 3 | 16 | 4·16 | Round. |
| Early Flat Dutch | 3 | 14½ | 2 | 9 | 3 | 13¾ | 7 | 28½ | .... | .... | 4·38 | Flat, round. |
| Midsummer | 6 | 26 | 1 | 4 | 2 | 12¼ | 2 | 9½ | 4 | 18½ | 4·68 | Round. |
| Premium Flat Dutch | 3 | 12 | 2 | 9 | 2 | 12½ | 5 | 33 | 3 | 18 | 5·63 | Flat, round. |
| All Seasons | 4 | 22¼ | 4 | 19½ | 3 | 13 | 2 | 11¼ | 2 | 16 | 5·46 | " |
| All Head | 3 | 16¾ | 3 | 16¼ | 5 | 18¼ | 4 | 14½ | .... | .... | 4·38 | Flat, round. |
| Market Gardeners | 2 | 7½ | 3 | 15 | 4 | 20½ | 3 | 14 | 3 | 14¾ | 4·78 | Round. |
| Enkhuisen | 4 | 12 | 6 | 21½ | 2 | 8 | 3 | 12½ | .... | .... | 3·60 | " |
| Improved Brunswick | 2 | 10¼ | 4 | 20¾ | 1 | 3¾ | 3 | 15 | 5 | 23 | 4·85 | Flat, round. |
| Dutch Winter | 1 | 4½ | 4 | 28½ | 2 | 10¼ | 2 | 11 | 6 | 32 | 5·75 | " |
| Stone Mason | 1 | 5½ | 2 | 12½ | 2 | 11 | 2 | 22 | 8 | 44½ | 6·36 | " |
| | Aug. 28. | | Sept. 2. | | Sept. 10. | | Sept. 14. | | Sept. 30. | | | |
| Late Flat Dutch | 3 | 23 | 3 | 14½ | ... | .... | 5 | 44 | 4 | 29½ | 7·40 | Flat. |
| Lupton | 1 | 5 | 2 | 9½ | 4 | 28 | 8 | 41½ | .... | .... | 5·56 | Flat, round. |
| Mammoth Rock Red | 1 | 5¼ | 1 | 4 | .... | .... | 4 | 33 | 9 | 51¾ | 6·26 | Round. |
| Large Red Drumhead | 1 | 6 | 1 | 5½ | 2 | 11 | 6 | 52½ | 5 | 32 | 7·13 | Flat, round. |
| Hard Heading | 2 | 7¾ | .... | .... | 4 | 20 | 4 | 18 | 5 | 23½ | 4·61 | Round. |
| Cannon Ball | 1 | 4¾ | .... | .. | 4 | 27 | 5 | 28¼ | 5 | 26½ | 5·76 | " |
| White Giant | .... | .... | 3 | 12¾ | 2 | 14 | 3 | 17½ | 7 | 25¾ | 4·66 | " |
| Danish Baseball | 1 | 3 | .... | .... | 4 | 26¼ | 2 | 15 | 8 | 42¾ | 5·80 | " |
| Vandergaw | 3 | 16½ | 1 | 7½ | 1 | 9 | 2 | 12 | 8 | 52¼ | 6·48 | Flat, round. |
| Houser | 4 | 22 | .... | .... | 2 | 10¼ | 3 | 26 | 6 | 33¾ | 6·13 | Round. |
| Succession | 3 | 12 | .... | .... | 3 | 14½ | 2 | 9¾ | 7 | 37¾ | 4·93 | " |
| Hartford | .... | .... | 4 | 32 | .... | .... | 2 | 10 | 9 | 42 | 5·60 | " |
| Autumn King | .... | .... | 4 | 28 | .... | .... | 3 | 23¼ | 8 | 67 | 7·88 | Flat, round. |
| Solid Emperor | .... | .... | .... | .... | 10 | 72 | 2 | 14 | 3 | 19½ | 7·03 | " |

## EXPERIMENTS WITH EARLY POTATOES.

The object of this experiment was to gain information as to the relative earliness of different sorts of early potatoes. Seventeen sorts were selected and planted in rows, 26 inches apart, and the seed dropped one foot apart in the rows. They were given cultivation similar to the field crop of potatoes.

The ground was previously in vegetables. It was manured in the fall of 1902 with twenty one-horse cart loads of stable manure per acre and ploughed under. This was worked up in the spring by ploughing and harrowing with the disc and springtooth harrows, and once with the smoothing harrow, after 300 lbs. per acre of complete fertilizer had been sown broadcast. Drills were run with the plough, the seed dropped, and covered with the plough.

The seed started regularly and a strong vigorous growth was made up to the first of August, when the Early Blight or leaf spot disease *(Macrosporium solani)* made its appearance. This blight is different from the late blight *(Phytophthora infestans)*. The plants had been dusted with Bug Death at the rate of 100 lbs. per acre July 20, and on the appearance of this blight Bordeaux mixture was sprayed on the plants August 4. The plants, however, had already been infected and this did little good. The field plots of potatoes, which were thoroughly sprayed with Bordeaux mixture July 20, showed no signs of the disease. The plants made no practical gain after August 20, as will be seen from the results given below, and the vines were nearly all dead by September 4. There were no rotten tubers in the field. This disease, unlike the late blight, is not accompanied by a decay of the tubers.

A plot of each variety was dug August 8, and duplicate ones August 20 and September 4. The yield from each plot, one row 66 feet long; is given in the following table, also the average yield of all the plots at the different dates of digging. It will be seen that the yield per acre increased 84 bushels per acre in the twelve days from August 8 to August 20.

### EXPERIMENTS WITH EARLY POTATOES.

| Name of Variety. | Dug Aug. 8. | | Dug Aug. 20. | | Dug Sept. 4. | |
|---|---|---|---|---|---|---|
| | Marketable per plot. | Not marketable per plot. | Marketable per plot. | Not marketable per plot. | Marketable per plot. | Not marketable per plot. |
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| Irish Cobbler | 46 | 6 | 66½ | 8 | 65½ | 13 |
| Early Andes | 37 | 6 | 61½ | 9 | 48 | 8¼ |
| Early Michigan | 35¾ | 4 | 45½ | 8 | 47¾ | 11¼ |
| Reeves' Rose | 35 | 7¾ | 47½ | 11 | 48 | 8½ |
| Crown Jewel | 34½ | 8 | 55 | 8½ | 45¼ | 13 |
| Beauty of Hebron | 34 | 7 | 56¾ | 9 | 45 | 9¾ |
| Bovee | 33½ | 6 | 45¼ | 5¼ | 42¼ | 11 |
| Pearce's Extra Early | 33½ | 5 | 53½ | 7¼ | 50¾ | 11 |
| Canadian Beauty | 33 | 4¼ | 51½ | 3¾ | 54½ | 7¾ |
| Early Harvest | 32 | 6½ | 42½ | 7¾ | 43¼ | 11¼ |
| Early Sunrise | 31¼ | 5 | 33¼ | 6¼ | 39¾ | 6 |
| Earliest of all | 30½ | 3 | 42 | 3¾ | 42 | 7 |
| Early Ohio | 29½ | 3½ | 41¾ | 2¾ | 58 | 4½ |
| Early Gem | 27 | 3¾ | 44½ | 5½ | 52½ | 6¼ |
| Rawdon Rose | 26¼ | 3 | 50 | 5½ | 41¾ | 10½ |
| Early Rose | 25 | 2½ | 31½ | 6 | 28¼ | 8½ |
| Early Norther | 17¾ | 3½ | 60 | 3 | 60½ | 6 |

AVERAGE YIELD OF ALL THE PLOTS.

| When Dug. | Marketable. | | Not Marketable. | |
|---|---|---|---|---|
| | Bush. | Lbs. | Bush. | Lbs. |
| August 8 | 157 | 56 | 24 | 34 |
| " 20 | 241 | 56 | 32 | 9 |
| September 4 | 237 | 7 | 44 | 46 |

POTATOES CUT IN DIFFERENT WAYS FOR PLANTING.

The object of this experiment was to ascertain whether any gain was made by cutting potatoes in different ways for seed. The variety Bovee was used. The land on which these tests were made was similar to that on which the early potatoes were grown, and received the same treatment in every particular.

On plot No. 1 small whole potatoes were planted; No. 2 medium whole potatoes; No. 3 the potatoes were cut in two crosswise, and both halves of the potato planted; No. 4, the potatoes were cut in two lengthwise and both halves planted; No. 5, the potatoes were cut in two crosswise, and the seed end half only planted; No. 6, the potatoes were cut in two crosswise, and the butt end half only planted; No. 7, a piece with only one eye; No. 8, a piece with two eyes, and No. 9 a piece with three eyes.

Each plot was one row 33 feet long. They were dug on August 20, and duplicate plots dug September 4. The following yields were obtained:—

| Number. | How Cut. | Dug Aug. 20 | | Dug Sept. 4. | |
|---|---|---|---|---|---|
| | | Marketable per plot. | Not marketable per plot. | Marketable per plot. | Not marketable per plot. |
| | | Lbs. | Lbs. | Lbs. | Lbs. |
| 1 | Small whole | 18¼ | 6 | 12½ | 10½ |
| 2 | Medium whole | 28 | 13½ | 32 | 18¼ |
| 3 | Cut in two crosswise | 20¾ | 6½ | 24¼ | 10 |
| 4 | Cut in two lengthwise | 30 | 4 | 36 | 8¼ |
| 5 | Seed end half | 24½ | 9 | 32 | 11 |
| 6 | Butt end half | 22¾ | 5½ | 27½ | 9 |
| 7 | One eye | 10½ | ½ | 12 | 2 |
| 8 | Two eyes | 24 | ½ | 22¾ | 2 |
| 9 | Three eyes | 22 | 2 | 26 | 4½ |

LIMING *versus* NOT LIMING POTATO SEED FOR PLANTING.

This experiment was for the purpose of testing the value of rolling cut tubers ready for planting in air-slacked lime. For this test the early potato plots were divided into two plots, on one-half of which seed rolled in lime was planted, and the other half planted with seed not limed. The seed was cut just before planting.

These plots were dug August 20, and duplicate ones September 4. Each plot dug in this test was 17 rows (each row a variety), 33 feet long and 26 inches apart. The yield per acre has been calculated from the weight of marketable and unmarketable ubers obtained. As these plots were the same as the early potato plots, the premature decay of the vines already mentioned resulted in no practical increase of yield after the digging of August 20.

| How Treated. | Dug Aug. 20. | | | | | | Dug Sept. 4. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Marketable per acre. | | Not marketable per acre. | | Total Yield per acre. | | Marketable per acre. | | Not marketable per acre. | | Total Yield per acre. | |
| | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. |
| Limed. .. .............. | 246 | 19 | 33 | 50 | 280 | 9 | 242 | 31 | 49 | 52 | 292 | 23 |
| Not limed.. . .......... | 235 | 19 | 30 | 29 | 265 | 48 | 232 | 10 | 39 | 40 | 271 | 50 |

I have the honour to be, sir,
Your obedient servant,

W. S. BLAIR,
*Horticulturist.*

# EXPERIMENTAL FARM FOR MANITOBA.

## REPORT OF S. A. BEDFORD, SUPERINTENDENT.

BRANDON, MANITOBA, November 30, 1903.

Dr. WILLIAM SAUNDERS,
Director Dominion Experimental Farms,
Ottawa, Canada.

SIR,—I have the honour to submit herewith my fifteenth annual report, with details of experiments undertaken and work accomplished on the Brandon Experimental Farm during the past year.

The past winter was a very favourable one, snow came fairly early and remained all winter; severe storms were rare and the weather was generally favourable for out of door work. Spring opened up on April 3, and a small area of wheat was sown on that date in some parts of the province, but colder weather followed and seeding did not commence on this farm until about April 16. May began fine, but cool; by the middle of the month the temperature had increased, and a much-needed rain fell on the 16th; the remainder of the month was showery and favourable for growth.

The early part of June set in very warm, and growth was very rapid, but later in the month grain on fall and spring ploughing was in great need of rain, particularly in the eastern portion of the province.

July and August were unusually cloudy and cool, with much east wind and frequent showers; fogs were also prevalent.

September opened with a severe frost on the 4th, injuring all tender vegetation; fortunately the bulk of the grain throughout the province was cut by this date, but much fodder corn and other tender vegetation was injured. On the 12th and 13th of this month occurred one of the worst snow storms ever recorded here during September. The storm found nearly all the grain in the stook, and stacking was delayed for about two weeks and the quality of wheat reduced two, and in some cases, three grades.

During the last week of September and nearly all October the weather was unusually fine and gave opportunity for threshing and fall ploughing, which had been much delayed.

### WHEAT.

This important grain has had much to contend with during the past season; drought threatened it during June, rust was very prevalent on some of the stronger soils, and unseasonable weather in September threatened to spoil the sample, but in spite of all these drawbacks, the sample is generally a fair one, and the prices are above the average; so that farmers will realize nearly an average return for their crop. On this farm both the yield and sample were greatly injured by rust, so prevalent, especially on the valley land during the close, moist days of August; the uniform test plots suffered most from this cause, possibly this was owing to the well compacted summer-fallow soil retaining the moisture and causing an over-rank growth.

On the larger fields of grain where the soil was ploughed later in the season and was somewhat drier, the straw was fairly bright, and there was scarcely any injury from this cause; the sample was plump and weighed the full standard weight.

As usual, the Goose and Roumanian wheats were practically free of rust, and were for this reason much more productive than any of the other varieties and also heavier per bushel.

The following varieties of wheat were sown here for the first time this year, but none of them promise to equal our standard varieties, Red and White Fife.

Velvet Don wheat has some resemblence to Goose wheat, but was somewhat earlier, and the beard is dark in colour.

Mishriki and Oregon Club were on trial for the first time this year, but neither of them are promising.

Gejar is evidently a fall wheat, and it produced only a few scattered heads.

The Blue-stem grown among the uniform test plots this year is from the western states, and is quite distinct from the variety with blue tinted straw and velvet chaff usually grown by that name in this province.

Owing to rust many of the kinds of wheat in the uniform test of varieties ripened prematurely, and for that reason the dates of ripening given are only approximate.

Sixty-four varieties of spring wheat were tested this year. These were sown from April 20 to 27, on black loam soil, in plots of one-twentieth acre each. All the seed was treated with bluestone, and all the varieties were quite free of smut.

### Spring Wheat.—Test of Varieties.

| Name of Variety. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Heads. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | Lbs. | Bush. | Lbs. | Lbs. | |
| Goose | Apr. 24 | Aug. 28 | 126 | 41 | Weak | 3 | Bearded.. | 5,620 | 46 | 20 | 63½ | None |
| Roumanian | " 24 | " 26 | 124 | 51 | " | 2½ | " .. | 5,120 | 44 | 40 | 63 | Slightly. |
| Velvet Don | " 27 | " 28 | 123 | 42 | Stiff.. | 2½ | " .. | 6,200 | 40 | 00 | 63 | None. |
| Australian No. 9 | " 21 | " 20 | 121 | 49 | " | 3 | Beardless. | 4,560 | 34 | 00 | 60 | Slightly. |
| Chester | " 21 | " 19 | 120 | 37 | Fair.. | 3¾ | " .. | 3,190 | 33 | 30 | 60¼ | Badly |
| Blair | " 21 | " 21 | 122 | 45 | " | 3 | " .. | 2,710 | 31 | 30 | 59 | Consid'rably |
| Fraser | " 24 | " 18 | 116 | 41 | Weak | 3 | Bearded.. | 3,320 | 31 | 20 | 59 | Badly. |
| White Russian | " 22 | " 24 | 124 | 45 | Fair.. | 4 | Beardless" | 4,860 | 30 | 40 | 58 | Slightly. |
| Wellman's Fife | " 22 | " 23 | 123 | 44 | Stiff.. | 4 | " .. | 5,580 | 30 | 20 | 57½ | " |
| Dawn | " 21 | " 18 | 119 | 40 | " | 3½ | " .. | 2,980 | 30 | 20 | 58 | Badly. |
| Angus | " 22 | " 20 | 120 | 39 | Fair.. | 3 | " .. | 4,600 | 30 | 00 | 58 | Consid'rably |
| Benton | " 24 | " 24 | 122 | 43 | Weak | 4 | " .. | 3,440 | 29 | 20 | 58½ | Slightly. |
| Percy | " 20 | " 20 | 122 | 47 | Stiff.. | 3½ | " .. | 4,850 | 29 | 10 | 58 | " |
| Crawford | " 21 | " 19 | 120 | 44 | Fair.. | 4 | " .. | 3,260 | 29 | 00 | 59½ | " |
| Bishop | " 21 | " 21 | 122 | 37 | Stiff.. | 3½ | " .. | 3-680 | 28 | 40 | 60 | " |
| Weldon | " 20 | " 18 | 120 | 47 | Fair . | 4 | " .. | 4,680 | 28 | 40 | 58 | Badly. |
| Herisson Bearded | " 24 | " 26 | 124 | 40 | Weak | 2 | Bearded.. | 3,500 | 28 | 20 | 57 | " |
| Hungarian | " 24 | " 24 | 122 | 48 | Fair . | 3 | " .. | 4,300 | 28 | 20 | 56 | Slightly. |
| Advance | " 22 | " 21 | 121 | 46 | " | 4 | " .. | 4,310 | 28 | 10 | 59 | " |
| Alpha | " 21 | " 22 | 123 | 50 | Stiff . | 3½ | Beardless. | 4,120 | 28 | 00 | 58 | " |
| Plumper | " 22 | " 25 | 125 | 42 | Fair . | 3½ | Bearded.. | 3,720 | 28 | 00 | 59 | Badly. |
| Admiral | " 21 | " 21 | 122 | 42 | Stiff . | 3¾ | Beardless. | 3,540 | 27 | 40 | 58 | Slightly. |
| Huron | " 22 | " 23 | 123 | 41 | " | 4 | Bearded.. | 3,540 | 27 | 40 | 59 | Consid'rably |
| Stanley | " 21 | " 19 | 120 | 44 | " | 3 | Beardless. | 4,540 | 27 | 40 | 59 | Badly. |
| White Fife | " 22 | " 23 | 123 | 42 | Fair . | 3 | " .. | 2,340 | 27 | 40 | 58 | Consid'rably |
| Cartier | " 24 | " 21 | 119 | 41 | Weak | 3 | Bearded.. | 3,740 | 27 | 40 | 58½ | Badly. |
| Byron | " 22 | " 23 | 123 | 27 | " | 3 | " .. | 4,240 | 27 | 40 | 59 | " |
| Norval | " 22 | " 22 | 122 | 41 | Stiff . | 3 | " .. | 3,580 | 27 | 00 | 59½ | Slightly. |
| Vernon | " 24 | " 24 | 122 | 45 | " | 3 | " .. | 4,280 | 27 | 00 | 57 | " |
| Cassel | " 21 | " 21 | 122 | 46 | " | 4 | Beardless. | 3,390 | 26 | 50 | 57½ | Badly. |
| Minnesota No. 149 | " 21 | " 23 | 124 | 49 | " | 4 | . .. | 3,390 | 26 | 50 | 58½ | Slightly. |
| Japanese | " 24 | " 18 | 116 | 36 | Weak | 3 | Bearded.. | 3,200 | 26 | 40 | 58 | Badly. |
| Laurel | " 22 | " 23 | 123 | 43 | " | 4 | Beardless. | 6.840 | 26 | 00 | 56½ | " |
| White Connell | " 22 | " 23 | 123 | 41 | Fair . | 4 | " .. | 3,840 | 26 | 00 | 58 | " |
| Rio Grande | " 22 | " 22 | 122 | 48 | " | 3 | Bearded.. | 5,040 | 26 | 00 | 58¼ | " |
| Monarch | " 22 | " 23 | 121 | 45 | Stiff " | 3½ | Beardless. | 3,640 | 26 | 00 | 58½ | " |
| Red Fern | " 24 | " 24 | 122 | 54 | " | 4 | Bearded.. | 4,450 | 25 | 50 | 58 | Slightly. |
| Hastings | " 21 | " 19 | 120 | 40 | Fair . | 3 | Beardless. | 2,460 | 25 | 40 | 58 | Consid'rably |
| Robin's Rust Proof | " 22 | " 22 | 122 | 44 | " | 3½ | " .. | 3,670 | 25 | 30 | 59 | Slightly. |
| Clyde | " 22 | " 24 | 124 | 45 | Weak | 4 | " .. | 3,770 | 25 | 30 | 56½ | " |

### SPRING WHEAT.—TEST OF VARIETIES—*Concluded.*

| Name of Variety. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Heads. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | Lbs. | Bush. | Lbs. | Lbs. | |
| Minnesota No. 181... | Apr. 21 | Aug. 23 | 123 | 43 | Stiff . | 4 | Beardless. | 3,500 | 25 | 60 | 59½ | Badly. |
| Mishriki.............. | " 22 | " 19 | 119 | 27 | " | 2½ | Bearded.. | 3,700 | 25 | 00 | 60½ | " |
| Crown ........... .. | " 24 | " 22 | 120 | 48 | Weak | 3 | " .. | 5,040 | 24 | 50 | 55 | " |
| Pringle's Champlain.. | " 24 | " 21 | 119 | 47 | " | 4 | " .. | 5,310 | 24 | 50 | 55 | Slightly. |
| Red Fife............. | " 22 | " 23 | 123 | 44 | Stiff . | 4 | Beardless. | 5,140 | 24 | 20 | 57 | " |
| Preston.............. | " 22 | " 23 | 123 | 47 | Fair . | 3 | Bearded.. | 3,580 | 23 | 40 | 59 | " |
| Progress......... ... | " 22 | " 23 | 123 | 42 | " | 3 | Beardless. | 2,580 | 23 | 40 | 58½ | " |
| Australian No. 27..... | " 21 | " 21 | 122 | 48 | Stiff . | 3 | " .. | 3,400 | 23 | 20 | 59 | " |
| Blue Stem...... ..... | " 22 | " 22 | 122 | 45 | Fair.. | 3¾ | " .. | 4,520 | 23 | 00 | 60 | Badly. |
| Early Riga... ...... | " 21 | " 18 | 118 | 38 | " | 3 | " .. | 4,260 | 22 | 20 | 58 | " |
| Australian No. 19.... | " 21 | " 24 | 125 | 42 | " | 3 | " .. | 3,060 | 22 | 20 | 58½ | Slightly. |
| Australian No 25...... | " 22 | " 24 | 124 | 46 | Stiff . | 4 | " .. | 3,080 | 22 | 00 | 58 | " |
| Australian No. 23..... | " 22 | " 24 | 124 | 43 | Fair . | 4 | " .. | 2,890 | 21 | 50 | 57 | Badly. |
| Australian No. 10..... | " 21 | " 24 | 125 | 42 | " | 4 | " .. | 2,900 | 21 | 40 | 58½ | Slightly. |
| Essex............... | " 22 | " 22 | 122 | 47 | Weak | 4 | " .. | 4,910 | 21 | 30 | 57 | Badly. |
| Minnesota No. 163.... | " 21 | " 24 | 125 | 48 | Stiff . | 4 | " .. | 4,320 | 21 | 20 | 58 | Slightly. |
| Countess.............. | " 22 | " 21 | 121 | 44 | Weak | 3½ | " .. | 3,030 | 20 | 50 | 56 | Badly. |
| Colorado. ........ | " 24 | " 24 | 122 | 51 | Fair . | 3½ | Bearded.. | 4,440 | 19 | 20 | 57 | " |
| Minnesota No. 169.. . | " 21 | " 24 | 125 | 47 | " | 3 | Beardless. | 4,930 | 18 | 30 | 50 | " |
| Red Swedish.......... | " 24 | " 22 | 120 | 44 | Weak | 3 | Bearded.. | 5,110 | 18 | 10 | 55½ | " |
| Australian No. 13..... | " 21 | " 24 | 125 | 46 | Stiff.. | 4 | Beardless. | 3,720 | 18 | 00 | 56 | Slightly. |
| Oregon Club.......... | " 22 | " 19 | 119 | 43 | Fair.. | 2 | " .. | 4,080 | 15 | 20 | 43½ | Badly. |
| Sejar................. | " 22 | ........ | ... | 44 | Stiff.. | 4 | " .. | 5,000 | 5 | 00 | 53 | Slightly. |

### AVERAGE Results of a Test of Nine Varieties of Wheat for the past Seven or Eight Years.

| Varieties. | Years under Test. | Yield per Acre. | |
|---|---|---|---|
| | | Bush. | Lbs. |
| Goose............ | 8 | 41 | 58 |
| White Fife.............. | 8 | 36 | 35 |
| Crown............ | 8 | 35 | 29 |
| Monarch... | 8 | 35 | 26 |
| Red Fife.......... | 8 | 34 | 43 |
| White Russian........ | 8 | 33 | 58 |
| White Connell... | 8 | 33 | 47 |
| Rio Grande....... | 8 | 33 | 24 |
| Preston...... | 7 | 32 | 58 |

### VARIETIES OF WHEAT GROWN FROM SELECTED AND UNSELECTED SEED.

As in former years, the largest heads were selected from standing grain of last year, and the seed was sown this year for a comparison with unselected seed, from the same plots.

The plots were all one-twentieth acre, and each pair were sown in close proximity; the soil was a black loam. The accompanying table gives the result of each individual variety. A summary is also given, which shows the average yield from the selected wheat to be eleven pounds per acre more than the unselected.

All were sown on summer fallowed land from April 20 to 27.

WHEAT.

| Variety. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. | Variety. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|
| | Lbs. | Bush. | Lbs. | Lbs. | | Lbs. | Bush. | Lbs. | Lbs. |
| Goose—Unselected | 5,620 | 46 | 20 | 63 | Advance—Unselected | 4,310 | 28 | 10 | 58 |
| " Selected | 5,060 | 45 | 40 | 63¾ | " Selected | 4,520 | 29 | 40 | 56½ |
| Roumanian—Unselected | 5.120 | 44 | 40 | 63½ | Alpha—Unselected | 4,120 | 28 | .. | 58 |
| " Selected | 5,100 | 48 | 20 | 63½ | " Selected | 4,100 | 21 | 40 | 57½ |
| Speltz—Unselected | 5,050 | 43 | 50 | 47½ | Plumper—Unselected | 3,720 | 28 | .. | 57 |
| " Selected | 6,340 | 54 | 20 | 47½ | " Selected | 4,300 | 28 | 20 | 58½ |
| Australian No. 9—Unselected | 4,560 | 34 | .. | 58 | Admiral—Unselected | 3,540 | 27 | 40 | 57½ |
| " Selected | 2,540 | 31 | .. | 57½ | " Selected | 3,190 | 20 | 10 | 58 |
| Chester—Unselected | 3,190 | 33 | 30 | 60½ | Huron—Unselected | 3,540 | 27 | 40 | 58¾ |
| " Selected | 3,030 | 32 | 50 | 60 | " Selected | 3,720 | 28 | .. | 58 |
| Blair—Unselected | 2,710 | 31 | 30 | 57½ | Stanley—Unselected | 4,540 | 27 | 40 | 57½ |
| " Selected | 3,600 | 30 | .. | 57½ | " Selected | 3,230 | 29 | 30 | 58 |
| Fraser—Unselected | 3,320 | 31 | 20 | 59 | Norval—Unselected | 3,580 | 27 | .. | 59½ |
| " Selected | 3,740 | 32 | 40 | 60 | " Selected | 3,200 | 26 | 40 | 60½ |
| Dawn—Unselected | 2,980 | 30 | 20 | 57 | Japanese—Unselected | 3,200 | 26 | 40 | 57½ |
| " Selected | 3,460 | 29 | .. | 58 | " Selected | 2,940 | 27 | 40 | 58 |
| Percy—Unselected | 4,850 | 29 | 10 | 59 | Rio Grande—Unselected | 5,040 | 26 | .. | 59 |
| " Selected | 4,010 | 29 | 50 | 59¼ | " Selected | 5,180 | 23 | 40 | 58 |
| Crawford—Unselected | 3,260 | 29 | .. | 55½ | Red Fern—Unselected | 4,450 | 25 | 50 | 58½ |
| " Selected | 3,330 | 31 | 10 | 56 | " Selected | 4,910 | 21 | 50 | 59 |
| Bishop—Unselected | 3,680 | 28 | 40 | 57½ | Hastings—Unselected | 2,460 | 25 | 40 | 56 |
| " Selected | 3,980 | 33 | 40 | 58 | " Selected | 2,640 | 27 | 40 | 58½ |
| Weldon—Unselected | 4,680 | 28 | 40 | 59 | Preston—Unselected | 3,680 | 23 | 40 | 59 |
| " Selected | 2,340 | 27 | 40 | 58½ | " Selected | 3,520 | 24 | 40 | 59½ |
| Herisson Bearded—Unselected | 3,560 | 28 | 20 | 56 | Early Riga—Unselected | 4,260 | 22 | 20 | 57 |
| " " Selected | 3,260 | 27 | 20 | 57½ | " Selected | 4,210 | 26 | 30 | 57 |

| | Bush. | Lbs. |
|---|---|---|
| Average yield of 26 varieties (selected) | 30 | 10 |
| " 26 " (unselected) | 29 | 59 |

FIELD PLOTS OF WHEAT.

The larger fields of wheat were ploughed late last summer, and did not receive as much surface cultivation as the test plots; probably this accounts for the smaller amount of rust in these fields; the sample of grain was much heavier per bushel and better in every respect.

All were sown on summer fallow, in the proportion of one and one-half bushels of seed per acre.

| Variety. | Character of Soil. | Size of Plot. | Date of Sowing. | Date of Ripening. | Weight per Bush. | Yield per Acre. | |
|---|---|---|---|---|---|---|---|
| | | | | | Lbs. | Bush. | Lbs. |
| Preston | Clay loam | 5 acres | April 17 | August 21 | 62 | 31 | 27 |
| White Fife | " | 3 " | " 21 | " 28 | 61 | 38 | 10 |
| Monarch | " | 2 " | " 21 | " 26 | 62 | 30 | 20 |
| White Connell | " | 2 " | " 20 | " 26 | 63 | 41 | 20 |
| Red Fife | " | 3 " | " 20 | " 28 | 62 | 26 | 50 |
| Percy | . | 2 " | " 18 | " 20 | 62 | 31 | 30 |
| Stanley | " | 2 " | " 18 | " 20 | 62 | 31 | 20 |

DIFFERENT METHODS OF PREPARING LAND FOR SPRING WHEAT.

In this series of tests the result is somewhat unusual, the summer fallowed plot giving the smallest return. This was no doubt owing to the grain on this plot growing unusually rank and rusting more than the others.

The plots in this experiment were all one-twentieth acre each; the soil a rich clay loam. All were sown on April 18.

| Name of Variety. | Previous Crop. | Rust. | Date of Ripening. | Yield per Acre. |  | Weight per Bush. |
|---|---|---|---|---|---|---|
|  |  |  |  | Bush. | Lbs. | Lbs. |
| Wheat—Red Fife | Turnips | Little | August 20 | 30 | 10 | 58 |
| " " | Millet | " | " 20 | 29 | .. | 54 |
| " " | Sunflowers | Badly | " 20 | 28 | 40 | 54 |
| " " | Flax | " | " 20 | 28 | 20 | 52 |
| " " | Horse Beans | " | " 20 | 28 | 10 | 51 |
| " " | Pease | " | " 20 | 26 | 40 | 55 |
| " " | Summer fallow | Very badly | " 20 | 26 | 10 | 54 |

A TEST OF GRAIN DRILLS.

Disc-drills, a comparatively new implement, are becoming extensively used in many parts of the province, and some extravagant claims are made for them. From the following table it would appear that there is very little difference in yield between the two ways of sowing.

The size of the plots was one-twentieth acre; the soil a sandy loam, which had been summer fallowed.

| Variety. | Kind of Drill. | Sown. | Ripe. | Days Maturing. | Yield per Acre. |  | Weight per Bush. |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  | Bush. | Lbs. | Lbs. |
| Red Fife | Shoe drill | April 24 | August 25 | 123 | 28 | 10 | 57 |
| " | Disc drill | " 24 | " 25 | 123 | 27 | 20 | 56½ |

EXPERIMENTS WITH THE USE OF BARN YARD MANURE.

During several seasons experiments have been carried on with fertilizers on the lower portion of this farm, but with very unsatisfactory results. This year a series of plots for this purpose were laid out on the upper portion of the farm, where the soil is quite light and somewhat exhausted. It will be seen from the accompanying table that the result is again somewhat contradictory.

The size of the plots in this series was one-twentieth acre, and the soil a very light sandy loam, the previous crop being wheat.

The varieties of grain sown were Red Fife wheat and Mensury barley.

| Number | Kind of Grain. | How Treated. | Sown. | Ripe. | Yield per Acre. |  | Weight per Bush. |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  | Bush. | Lbs. | Lbs. |
| 1 | Wheat | 10 loads per acre rotted manure | April 20 | August 23 | 13 | 30 | 58 |
| 2 | " | No manure | " 20 | " 23 | 16 | 10 | 58 |
| 3 | " | 10 loads per acre fresh manure | " 20 | " 23 | 18 | .. | 58 |
| 6 | " | No manure | " 20 | " 23 | 16 | 30 | 58 |
| 11 | Barley | No manure | May 14 | " 14 | 20 | .. | 47½ |
| 12 | " | 10 loads per acre fresh manure | " 14 | " 14 | 16 | 12 | 47½ |
| 13 | " | 10 " rotted " | " 14 | " 14 | 18 | 6 | 47½ |

### EXPERIMENTS WITH ARTIFICIAL FERTILIZERS.

The tests with chemical fertilizers carried on for the past three years were again undertaken this year, but owing to an unusual interference the test was spoilt. The plots were laid out in a somewhat secluded location, and shortly after the crop was cut, it was nearly all destroyed by prairie chickens.

### SMUT PREVENTIVES IN WHEAT.

Although it is now generally recognized by the older residents that injury from smut can be prevented, many new-comers are either ignorant of the risk in sowing untreated grain or else do not know of a preventive, and every year there is still considerable loss from this cause.

This year's test included the use of both bluestone and formalin, and both of these preparations were effective in preventing injury from this cause whether they were applied by steeping or sprinkling.

The seed used was badly 'tagged' with smut, and it will be noticed from the accompanying table that nearly 20 per cent of the crop from untreated seed was destroyed, while the treated seed was practically free of smut.

| Variety. | How Treated. | Good Heads on 9 Sq. Ft. | Smutty Heads on 9 Sq. Ft. |
|---|---|---|---|
| Red Fife ....... | Steeped for 5 minutes in 4½ oz. formalin to 10 galls. of water.. | 306 | None. |
| " ....... | Sprinkled with 9 oz. of formalin to 10 galls. of water ........ | 419 | " |
| " ....... | Steeped for 5 minutes in 1 lb. of bluestone to 3 pails of water. | 264 | 1 |
| " ....... | Sprinkled with 1 lb. bluestone to 1 pail of water............. | 253 | None. |
| " ....... | Not treated.......................................... | 383 | 65 |

### EXPERIMENTS WITH SPELT AND EMMER.

Three newly introduced varieties of emmer and spelt were tested this year; none of these are as promising as the common emmer in general use here, the yield of grain being smaller and the weight per bushel less.

The size of the plots was one-twentieth acre for the common spelt and one-fortieth for the others. The soil was a sandy loam which had been summer-fallowed.

| Variety. | Sown. | Ripened. | Length of Straw. | Length of Head. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|
| | | | Inches. | Inches. | Bus. | Lbs. | Lbs. |
| White Emmer (Common Emmer known also as Spelt)....... | April 24.. | Aug. 29.. | 42 | 2½ | 43 | 50 | 47½ |
| Red Emmer.... | " 27.. | " 28.. | 43 | 3 | 38 | 40 | 39 |
| Smooth Spelt ........ | " 27.. | " 26.. | 41 | 6 | 29 | 20 | 26 |
| White Bearded Spelt ........ | " 27.. | " 25.. | 41 | 6 | 27 | 00 | 26 |

In all these varieties the yield per acre is based on a bushel of 60 lbs. No allowance, however, has been made for the husk. When comparing these yields with clean wheat at least 20 per cent should be deducted from the emmer or spelt to make the comparison a fair one.

### A CROP OF SPELT AS A PREPARATION FOR OTHER GRAIN.

Very little is known regarding the influence of spelt (emmer) on the succeeding crop; with a view of gaining some light on this subject, three sets of plots were laid out. One was sown with wheat, one with oats, and one with barley; the result was fairly uniform, and in each series the plot sown the previous year with spelt gave the largest return, followed by summer-fallow; the wheat stubble giving the smallest crop in each case.

The spelt shelled badly in 1902, and the volunteer crop was very apparent this year, both in the field and threshed grain, and probably increased the yield of grain. The size of the plots was one-twentieth acre, and the soil a sandy loam.

| Grain sown 1903. | Previous Crop. | Sown. | Ripened. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|
| | | | | Bus. | Lbs. | Lbs. |
| Wheat Red Fife | Spelt (Emmer) | April 18 | Aug. 24 | 51 | 40 | 57½ |
| " " | Summer fallow | " 18 | " 24 | 29 | 40 | 57 |
| " " | Wheat | " 18 | " 24 | 26 | 00 | 58 |
| Oats, Banner | Spelt (Emmer) | " 27 | " 25 | 100 | 30 | 37½ |
| " " | Summer fallow | " 27 | " 24 | 92 | 12 | 37 |
| " " | Wheat | " 27 | " 24 | 88 | 28 | 37 |
| Barley, Mensury | Spelt (Emmer) | May 11 | " 7 | 57 | 24 | 47½ |
| " " | Summer fallow | " 11 | " 7 | 55 | 20 | 48 |
| " " | Wheat | " 17 | " 7 | 28 | 16 | 47½ |

### ROTATION OF CROPS.

In acordance with your instructions arrangements were made during 1899 for a series of rotation plots on one-half acre each, the principal object in view being the maintenance of the fertility of the soil, by ploughing under a leguminous crop every third year, instead of the usual summer-fallow.

The soja beans were sown in rows 14 inches apart, using 60 pounds of seed per acre; the red clover was sown in the proportion of 12 pounds of seed per acre and the mixed clovers in the proportion of eight pounds of alfalfa and six pounds of alsike per acre. These leguminous plants were ploughed under each year when they reached their fullest development. The order of rotation is as follows :—

| No. | First Year. | Second Year. | Third Year. |
|---|---|---|---|
| 1 | Wheat | Oats | Soja Beans. |
| 2 | " | Wheat | Pease. |
| 3 | " | Oats | Tares. |
| 4 | " | Wheat | Red Clover. |
| 5 | " | Barley | Alfalfa and Alsike. |
| 6 | Pease | Wheat | Wheat. |
| 7 | Tares | " | Oats. |
| 8 | Soja Beans | " | " |
| 9 | Red Clover | " | Wheat. |
| 10 | Alfalfa and Alsike | " | Barley. |
| 11 | Rape | " | Summer-fallow. |
| 12 | Wheat | " | " |
| 13 | " | Oats | " |
| 14 | " | Barley | " |
| 15 | " | Wheat | Oats. |
| 16 | " | Barley | " |
| 17 | Oats | Soja Beans | Wheat. |
| 18 | Wheat | Pease | " |
| 19 | Oats | Tares | " |
| 20 | Wheat | Red Clover | " |
| 21 | Barley | Alfalfa and Alsike | " |
| 22 | Rye | Summer-fallow | " |

In 1901 the first series of three years was completed. Owing to the unusual high water in the Assiniboine river last year the field was left fallow. This year the second series of three years of rotation was commenced, with the following result:—

## ROTATION OF CROPS.

FIRST year of the second series.

| No. | Name of Varieties. | Date of Sowing. | Date of Ripening. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|
| | | | | Bush. | Lbs. | Lbs. |
| 1 | Wheat—Red Fife | April 22 | August 25 | 26 | 45 | 58 |
| 2 | " " | " 22 | " 25 | 31 | 45 | 58 |
| 3 | " " | " 22 | " 25 | 23 | 25 | 58 |
| 4 | " " | " 22 | " 25 | 28 | 39 | 58 |
| 5 | " " | " 24 | " 25 | 30 | 45 | 58 |
| 6 | Pease—Golden Vine | " 24 | Ploughed under | | | |
| 7 | Tares | May 11 | " | | | |
| 8 | Soja Beans | June 11 | " | | | |
| 9 | Clover—Red | April 23 | " | | | |
| 10 | Clover Alfalfa and Alsike | " 23 | " | | | |
| 11 | Rape | June 11 | " | | | |
| 12 | Wheat—Red Fife | April 24 | August 25 | 28 | 45 | 58 |
| 13 | " " | " 24 | " 25 | 27 | 13 | 58 |
| 14 | " " | " 24 | " 25 | 30 | 45 | 58 |
| 15 | " " | " 24 | " 25 | 28 | 01 | 58 |
| 16 | " | " 24 | " 25 | 29 | 40 | 58 |
| 17 | Oats—Banner | May 7 | " 25 | 56 | 24 | 37 |
| 18 | Wheat—Red Fife | April 24 | " 25 | 24 | 30 | 58 |
| 19 | Oats—Banner | May 7 | " 28 | 54 | 00 | 37 |
| 20 | Wheat—Red Fife | April 24 | " 25 | 26 | 15 | 58 |
| 21 | Barley—Mensury | May 7 | " 28 | 44 | 20 | 47 |
| 22 | Rye—Spring | April 25 | Ploughed under | | | |

## EXPERIMENTS WITH OATS.

The past season has been favourable for this grain in all parts of the province. On the experimental farm the yield is above the average, and the sample plump but slightly discoloured.

Swedish Select, grown this year for the first time, is a promising white variety with a very handsome branching head, and it proved very productive.

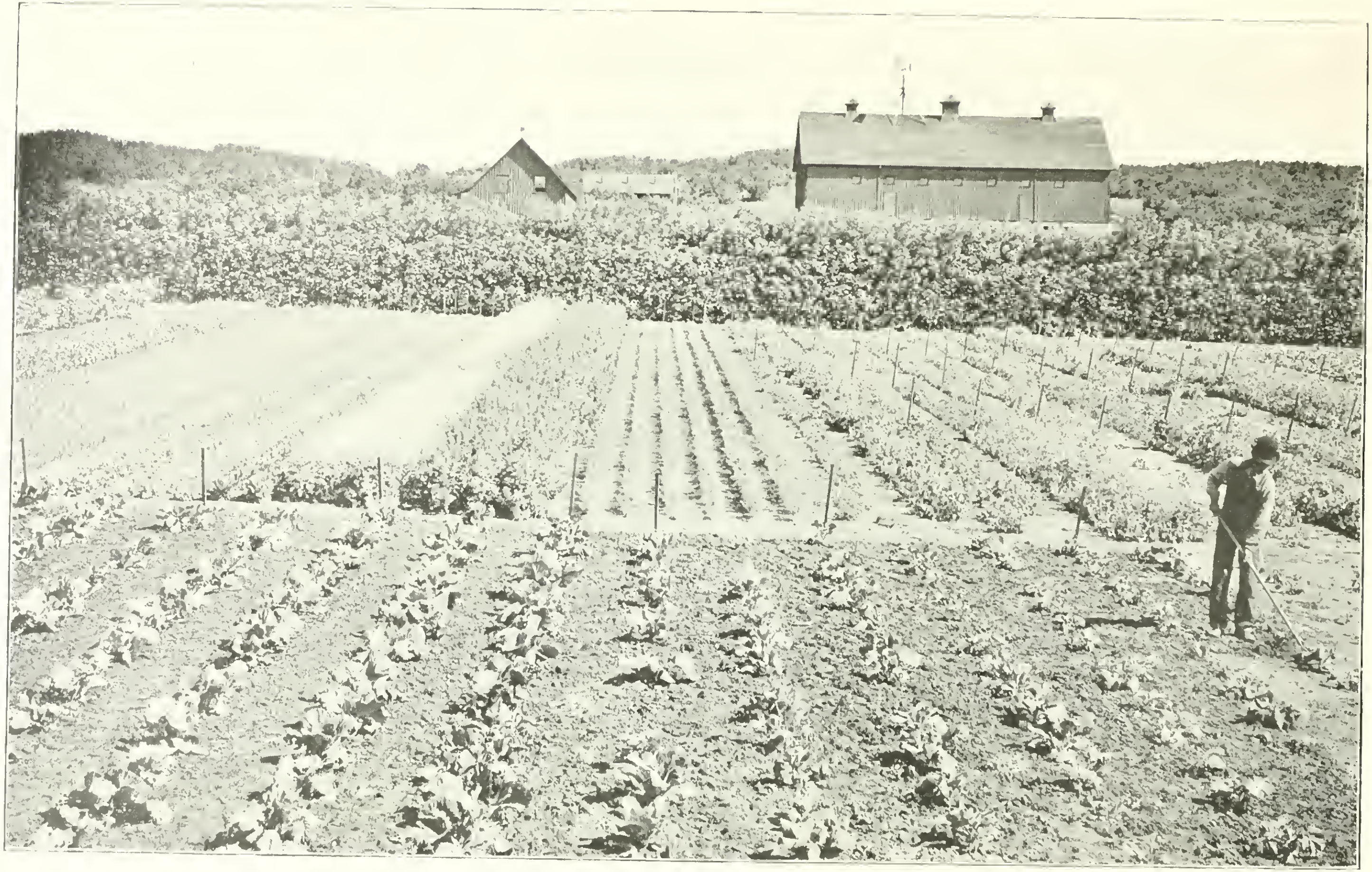
Golden Fleece, another new variety, did not prove nearly so productive.

Since the four cross-bred varieties, viz., Kendal, Milford, Pense and Olive, have been divided into white and black kinds, they have a much more uniform appearance, but were not very productive this year.

The plot of Banner oats was adjoining a well travelled road, and the grain was badly injured by vehicles. This accounts for the reduced yield of this variety.

The Tartar King oats used as seed for this test was very large and plump; this, combined with an almost total absence of stooling, made the sowing much too thin and reduced the yield.

The tests were made with forty-five varieties, on plots of one-twentieth acre each. The soil was a sandy loam; the previous crop Brome grass, and two bushels of seed per acre was used, sown with a drill. Golden Fleece was sown on May 14, and all the others on May 5 and 6.



(Photo. by C. E. Saunders.)

Plots of Vegetables at Brandon.

## OATS—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Sowing. | Date of Ripening. | No. of days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw. | Yield per acre. | | Weight per Bushel. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | In. | | In. | | Lbs. | Bush. | Lbs. | Lbs. | |
| 1 | Buckbee's Illinois... | May 5 | Aug. 21 | 108 | 47 | Stiff.. | 10 | Branching.. | 3,940 | 119 | 14 | 36 | Slightly |
| 2 | Early Golden Prolific | " 5 | " 22 | 109 | 47 | " .. | 10 | " .. | 4,280 | 115 | 10 | 37½ | " |
| 3 | New Zealand........ | " 5 | " 27 | 115 | 51 | " .. | 10 | Sided...... | 4,700 | 114 | 24 | 35 | Badly |
| 4 | Wide Awake....... | " 5 | " 23 | 110 | 49 | " .. | 7½ | Branching.. | 4,340 | 113 | 18 | 37½ | Slightly |
| 5 | Golden Giant....... | " 5 | " 29 | 116 | 48 | " .. | 10 | Sided....... | 4,580 | 109 | 14 | 37 | " |
| 6 | Abundance..... .... | " 5 | " 20 | 107 | 51 | " .. | 9 | Branching.. | 4,480 | 109 | 14 | 38½ | " |
| 7 | Waverley..... .... | " 5 | " 20 | 107 | 52 | " .. | 8 | " .. | 4,780 | 109 | 14 | 38½ | " |
| 8 | Lincoln............ | " 5 | " 22 | 109 | 47 | " .. | 9 | " .. | 4,700 | 108 | 28 | 38 | " |
| 9 | Danish Island ..... | " 5 | " 22 | 109 | 49 | " .. | 9 | " .. | 4,720 | 108 | 8 | 38 | " |
| 10 | Holstein Prolific.... | " 5 | " 22 | 109 | 47 | " .. | 7 | " .. | 4,430 | 107 | 32 | 36 | " |
| 11 | Irish Victor..... .... | " 5 | " 22 | 109 | 47 | " .. | 10 | " .. | 4,140 | 107 | 22 | 38 | " |
| 12 | Golden Tartarian.... | " 5 | " 25 | 112 | 49 | " .. | 10 | Sided....... | 4,390 | 106 | 6 | 37 | Badly |
| 13 | Improved Ligowo... | " 5 | " 20 | 107 | 49 | " .. | 8 | Branching.. | 4,810 | 105 | 20 | 42 | Slightly |
| 14 | Thousand Dollar ... | " 5 | " 20 | 107 | 52 | " .. | 7 | " .. | 4,520 | 105 | 10 | 39½ | " |
| 15 | Columbus... ....... | " 5 | " 21 | 108 | 44 | " .. | 8 | " .. | 4,150 | 104 | 14 | 36½ | " |
| 16 | Twentieth Century.. | " 5 | " 22 | 109 | 45 | " .. | 10 | " .. | 4,050 | 104 | 14 | 38½ | " |
| 17 | White Giant ....... | " 5 | " 22 | 109 | 45 | " . | 8 | " .. | 4,270 | 103 | 28 | 37 | " |
| 18 | White Schonen...... | " 5 | " 22 | 109 | 48 | " .. | 7 | " .. | 4,680 | 100 | 20 | 36 | " |
| 19 | American Beauty.... | " 5 | " 22 | 109 | 44 | " .. | 8 | " .. | 3,920 | 99 | 14 | 36½ | " |
| 20 | Wallis.............. | " 5 | " 23 | 110 | 47 | " .. | 8 | " .. | 4,230 | 99 | 4 | 36 | " |
| 21 | Siberian ............ | " 5 | " 23 | 110 | 45 | " .. | 8 | " .. | 4,240 | 98 | 28 | 35½ | " |
| 22 | Mennonite.......... | " 5 | " 18 | 105 | 46 | " .. | 6 | " .. | 3,840 | 98 | 28 | 39 | " |
| 23 | American Triumph.. | " 5 | " 22 | 109 | 44 | " .. | 8 | " .. | 3,650 | 98 | 18 | 37 | " |
| 24 | Salines....... ...... | " 5 | " 24 | 111 | 51 | " .. | 8 | " .. | 4,400 | 95 | 10 | 36 | " |
| 25 | Improved American. | " 6 | " 21 | 107 | 50 | " .. | 7½ | " .. | 4,360 | 95 | 10 | 36½ | " |
| 26 | Swedish Select...... | " 6 | " 20 | 106 | 43 | " .. | 6 | " .. | 3,700 | 94 | 4 | 42 | None |
| 27 | Golden Beauty...... | " 5 | " 22 | 109 | 47 | Fair.. | 8 | " .. | 3,460 | 93 | 18 | 36½ | Slightly |
| 28 | Black Beauty. .... | " 6 | " 20 | 106 | 43 | " . | 8 | " .. | 3,840 | 93 | 8 | 37½ | " |
| 29 | Bavarian........... | " 6 | " 23 | 109 | 47 | Stiff.. | 9 | " .. | 4,360 | 91 | 26 | 36½ | " |
| 30 | Scotch Potato....... | " 5 | " 22 | 109 | 39 | " .. | 8 | " .. | 4,680 | 91 | 26 | 38 | " |
| 31 | Kendal White..... | " 6 | " 26 | 109 | 44 | " .. | 9 | Sided....... | 2,780 | 91 | 26 | 36 | " |
| 32 | Sensation...... .... | " 5 | " 21 | 108 | 46 | " .. | 7 | Branching.. | 3,900 | 91 | 6 | 41 | " |
| 33 | Pioneer............. | " 6 | " 20 | 106 | 40 | Fair.. | 8 | " .. | 3,130 | 88 | 18 | 36 | " |
| 34 | Olive Black......... | " 6 | " 26 | 112 | 45 | " .. | 7 | " .. | 3,700 | 88 | 8 | 37½ | " |
| 35 | Milford Black... ... | " 6 | " 26 | 112 | 43 | " .. | 9 | Sided....... | 3,630 | 87 | 12 | 36 | " |
| 36 | Pense Black...... . | " 6 | " 26 | 112 | 44 | " .. | 9 | " ...... | 3,700 | 85 | 10 | 35½ | " |
| 37 | Banner............. | " 5 | " 20 | 107 | 49 | Stiff.. | 9 | Branching.. | 5,540 | 84 | 4 | 38 | " |
| 38 | Golden Fleece...... | " 14 | " 23 | 99 | 45 | " .. | 8 | " .. | 4,540 | 84 | 4 | 35½ | None |
| 39 | Goldfinder......... | " 5 | " 24 | 111 | 48 | " .. | 8 | " .. | 5,060 | 83 | 18 | 36 | Slightly |
| 40 | Joanette. ...... .... | " 6 | " 21 | 107 | 34 | Fair.. | 8 | " .. | 4,160 | 83 | 18 | 35 | " |
| 41 | Kendal Black....... | " 6 | " 26 | 112 | 43 | " .. | 8 | Sided. .... | 3,400 | 82 | 12 | 37 | " |
| 42 | Olive White ....... | " 6 | " 26 | 112 | 45 | " .. | 8 | " .... | 3,660 | 80 | 20 | 38 | " |
| 43 | Pense White.. .... | " 6 | " 26 | 112 | 47 | Stiff.. | 9 | " ..... | 2,680 | 80 | .. | 38 | None |
| 44 | Milford White...... | " 6 | " 26 | 112 | 47 | " .. | 9 | " ..... | 2,760 | 77 | 22 | 37½ | Slightly |
| 45 | Tartar King....... | " 5 | " 20 | 107 | 49 | . | 9 | " ..... | 3,860 | 77 | 22 | 39 | Considerably. |

## AVERAGE RESULTS OF A TEST OF SEVEN VARIETIES OF OATS FOR THE PAST SEVEN OR EIGHT YEARS.

| Varieties. | Years Under Test. | Yield per Acre. | |
|---|---|---|---|
| | | Bush. | Lbs. |
| American Beauty.................................................. | 8 | 91 | 10 |
| Mennonite...................................................... | 7 | 90 | 00 |
| Banner.......................................................... | 8 | 88 | 29 |
| Early Golden Prolific............................................ | 8 | 88 | 18 |
| Bavarian........................................................ | 8 | 87 | 19 |
| Holstein Prolific................................................ | 8 | 86 | 56 |
| Golden Giant.................................................... | 8 | 83 | 13 |

### FIELD PLOTS OF OATS, 1903.

These were all sown on summer fallow with a drill, in the proportion of two bushels of seed per acre.

| Variety. | Character of Soil. | Size of Field. | Date Sown. | Date Ripe. | Weight per Bushel. | Yield per Acre. | |
|---|---|---|---|---|---|---|---|
| | | | | | Lbs. | Bush. | Lbs. |
| Banner | Clay loam | 7 acres | April 28 | Aug. 15 | 37 | 83 | 15 |
| Improved Ligowo | " | 7 " | May 9 | " 20 | 37 | 73 | 18 |
| Tartar King | " | 6½ " | " 1 | " 17 | 38½ | 82 | 30 |
| Waverley | " | 5 " | " 8 | " 28 | 38 | 86 | 05 |
| Abundance | " | 3 " | " 13 | " 28 | 36 | 86 | 18 |

### DIFFERENT METHODS OF PREPARING LAND FOR OATS.

| Name of Variety. | Previous Crop. | Rust. | Date of Ripening. | Yield per Acre. | | Weight per Bush. |
|---|---|---|---|---|---|---|
| | | | | Bush. | Lbs. | Lbs. |
| Banner Oats | Flax | Little | Aug. 26 | 117 | 12 | 37 |
| " | Millet | " | " 19 | 115 | 00 | 37½ |
| " | Summer fallow | Bad | " 18 | 102 | 32 | 37 |
| " | Turnips | Little | " 20 | 85 | 10 | 38 |

## EXPERIMENTS WITH BARLEY.

The past season has been favourable for a heavy yield of barley, but the wet weather discoloured the sample. As nearly all the barley grown in this province is used for feed, the loss arising from discoloration was not serious.

Among the many varieties of barley grown on this farm, the Mensury is one of the best; the plant is vigorous and productive, the straw is stiff, and the head and kernels seldom fail to reach full development.

Twenty varieties of six-rowed barley were tested. The size of the plots used for this test was one-twentieth acre. The soil was a sandy loam which had been summer fallowed. All were sown on May 7 and 8, in the proportion of two bushels per acre. There was no rust on any of the plots.

### BARLEY—SIX ROWED—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Sowing. | Date of Ripening. | Number of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Weight of Straw. | Yield per Acre. | | Weight per bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | lbs. | Bush. | lbs. | lbs. |
| 1 | Nugent | May 8.. | Aug. 10.. | 94 | 34 | Stiff | 4 | 3,540 | 73 | 4 | 48½ |
| 2 | Mensury | " 7.. | " 10.. | 95 | 41 | " | 3½ | 2,760 | 71 | 32 | 50 |
| 3 | Yale | " 8.. | " 10.. | 94 | 38 | " | 3 | 4,440 | 70 | .. | 48½ |
| 4 | Summit | " 7.. | " 13.. | 98 | 40 | Fair | 3 | 3,570 | 67 | 14 | 49 |
| 5 | Brome | " 8.. | " 11.. | 95 | 30 | Weak | 3 | 3,000 | 66 | 32 | 49½ |
| 6 | Mansfield | " 7.. | " 11.. | 96 | 36 | Stiff | 2¾ | 3,820 | 66 | 12 | 48 |
| 7 | Odessa | " 8.. | " 10.. | 84 | 35 | Fair | 3 | 3,820 | 66 | 12 | 48 |
| 8 | Oderbruch | " 7.. | " 7.. | 92 | 33 | Stiff | 3 | 2,860 | 63 | 16 | 51 |
| 9 | Empire | " 8.. | " 12.. | 96 | 66 | Weak | 3 | 3,140 | 61 | 32 | 48 |
| 10 | Common | " 8.. | " 7.. | 91 | 38 | Stiff | 3 | 3,440 | 61 | 32 | 46 |
| 11 | Albert | " 8.. | " 11.. | 95 | 34 | " | 3 | 3,380 | 58 | 36 | 48¼ |
| 12 | Argyle | " 7.. | " 10.. | 95 | 37 | " | 3 | 2,720 | 55 | 40 | 48½ |
| 13 | Claude | " 8.. | " 10.. | 94 | 33 | " | 2½ | 3,140 | 55 | 20 | 48½ |
| 14 | Garfield | " 8.. | " 10.. | 94 | 38 | " | 3½ | 3,540 | 55 | 20 | 46½ |
| 15 | Rennie's Improved | " 7.. | " 7.. | 92 | 36 | " | 3 | 3,810 | 53 | 46 | 48½ |
| 16 | Stella | " 8.. | " 10.. | 94 | 30 | " | 3 | 4,410 | 53 | 46 | 48½ |
| 17 | Trooper | " 7.. | " 10.. | 95 | 35 | " | 3 | 4,240 | 53 | 16 | 47½ |
| 18 | Royal | " 7.. | " 10.. | 95 | 38 | " | 3 | 3,160 | 50 | 40 | 48 |
| 19 | Baxter | " 8.. | " 11.. | 95 | 38 | " | 2½ | 2,240 | 41 | 12 | 50 |
| 20 | Champion | " 8.. | " 4.. | 88 | 39 | " | 3 | 2,840 | 32 | 24 | 47 |

### AVERAGE RESULTS OF A TEST OF FOUR VARIETIES OF SIX-ROWED BARLEY FOR THE PAST SEVEN YEARS.

| Varieties. | Number of Years under Test. | Yield per Acre. | |
|---|---|---|---|
| | | Bush. | Lbs. |
| Mensury | 7 years | 56 | 17 |
| Nugent | 7 " | 53 | 27 |
| Trooper | 7 " | 52 | 30 |
| Summit | 7 " | 52 | 24 |

### BARLEY, TWO-ROWED—TEST OF VARIETIES.

The first sowing of two-rowed sorts of barley was made on May 8, but a very heavy fall of rain occurring before the plants were well rooted, a large portion of them in each plot were washed out, and a second sowing was made on June 5; these did not mature before severe frosts and the yield on this account was much smaller than the six-rowed varieties and the weight per bushel less.

Fifteen varieties of two-rowed barley were tested this season.

The plot of Newton barley was one-fortieth acre in size; all the others were one-twentieth acre.

The soil was a sandy loam which had been summer-fallowed; all were sown on June 8, in the proportion of two bushels of seed per acre.

BARLEY, TWO-ROWED—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | Number of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | Lbs. | Bush. | Lbs. | Lbs. | |
| 1 | Dunham | Sept. 15.. | 102 | 34 | Stiff.. | 3 | 4,650 | 40 | 30 | 48 | None. |
| 2 | Sidney | " 13.. | 100 | 34 | " .. | 4 | 3,410 | 39 | 18 | 47½ | Slightly. |
| 3 | Logan | " 14.. | 101 | 36 | " .. | 3 | 3,790 | 37 | 34 | 47½ | " |
| 4 | Harvey | " 13.. | 100 | 40 | " .. | 4 | 3,520 | 35 | .. | 47½ | None. |
| 5 | Fulton | " 14.. | 101 | 34 | " .. | 4 | 3,580 | 33 | 36 | 48 | " |
| 6 | Newton | " 17.. | 104 | 34 | " .. | 6 | 4,400 | 33 | 16 | 47½ | Slightly. |
| 7 | Invincible | " 14.. | 101 | 37 | " .. | 4 | 4,040 | 32 | 24 | 38 | " |
| 8 | Beaver | " 17.. | 104 | 34 | " .. | 3½ | 3,460 | 32 | 4 | 46½ | " |
| 9 | Standwell | " 19.. | 106 | 35 | " .. | 4 | 3,270 | 31 | 42 | 41 | " |
| 10 | Clifford | " 18.. | 105 | 34 | " .. | 6 | 3,370 | 31 | 42 | 45 | " |
| 11 | Jarvis | " 13.. | 100 | 38 | " .. | 5 | 4,730 | 30 | 30 | 50 | None. |
| 12 | Gordon | " 18.. | 105 | 37 | " .. | 4 | 3,560 | 30 | .. | 48 | Slightly. |
| 13 | Danish Chevalier | " 18.. | 105 | 35 | " .. | 5 | 3,410 | 28 | 46 | 47 | " |
| 14 | French Chevalier | " 18.. | 105 | 35 | " .. | 5 | 3,470 | 27 | 34 | 44½ | " |
| 15 | Canadian Thorpe | " 15.. | 102 | 30 | " .. | 3 | 4,220 | 24 | 28 | 40 | " |

DIFFERENT METHODS OF PREPARING LAND FOR BARLEY.

| Name of Variety. | Previous Crop. | Rust. | Date of Ripening. | Yield per Acre. | | Weight per Bushel |
|---|---|---|---|---|---|---|
| | | | | Bus. | Lbs. | Lbs. |
| Mensury—Barley (six-rowed) | Millet | None | Aug. 19.. | 67 | 4 | 48 |
| " " | Summer-fallow | " | " 18.. | 62 | 4 | 48½ |
| " " | Flax | " | " 26.. | 58 | 16 | 48 |
| " " | Turnips | " | " 7.. | 47 | 4 | 48½ |

## EXPERIMENTS WITH PEASE.

Forty varieties of pease were on trial this year, and the yield has been above the average.

Although some of the varieties were ripe a full month before they were harvested, there was scarcely any shelling and the sample was bright and heavy.

Pease are usually very productive here; the sample is bright and quite free from the attacks of pea wevil; the cost of harvesting and threshing is apparently the only drawback, and this can be largely overcome by sowing one or two pecks of oats per acre with the pease; the combined crop can then be cut with a binder, and threshed like other grain.

The size of the plots used for this test of varieties was one-twentieth acre. The soil was a clay loam, summer-fallowed. All were sown from April 25 to 29, in the proportion of two bushels of seed per acre for the small kinds and three bushels for the larger ones.

PEASE—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Character of Growth. | Length of Straw. | Length of Pod. | Size of Pea. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | in. | in. | | Bush. | Lbs. | Lbs. |
| 1 | Alma.. ... ......... | Apr. 25.. | Aug. 29.. | 126 | Weak..... | 57 | 2 | Small .... | 64 | 40 | 62½ |
| 2 | English Grey...... . | ″ 25.. | Sept. 1.. | 129 | Medium.. | 35 | 2¼ | ″ .... | 63 | .. | 61 |
| 3 | Early Britain.... ... | ″ 25.. | Aug. 21.. | 118 | Weak. ... | 53 | 2½ | Large .... | 60 | 20 | 61¼ |
| 4 | Macoun.,........... | ″ 25.. | Sept. 1.. | 129 | Medium.. | 67 | 3 | ″ .... | 57 | .. | 62¼ |
| 5 | Victoria. .... ...... | ″ 25.. | ″ 4.. | 132 | Rank..... | 55 | 3 | ″ .... | 54 | 40 | 62½ |
| 6 | German White....... | ″ 25.. | Aug. 29.. | 126 | Medium.. | 55 | 2½ | Small .... | 54 | 40 | 63 |
| 7 | Pearl............... | ″ 27.. | Sept. 3.. | 129 | Rank..... | 45 | 2½ | Medium.. | 54 | .. | 63¼ |
| 8 | Golden Vine........ | ″ 27.. | Aug. 25.. | 120 | Fair...... | 46 | 2 | Small .... | 53 | 40 | 62½ |
| 9 | Crown.............. | ″ 27.. | ″ 22.. | 117 | ″ ..... | 47 | 2 | ″ .... | 53 | .. | 62 |
| 10 | Archer............. | ″ 27.. | Sept. 1.. | 127 | Medium.. | 50 | 2½ | Medium.. | 51 | 40 | 62½ |
| 11 | Mackay...... ....... | ″ 27.. | ″ 1.. | 127 | Fair...... | 53 | 2½ | Large .... | 50 | 20 | 63 |
| 12 | Pride....... ....... | ″ 27.. | Aug. 29.. | 124 | Weak .... | 53 | 2½ | Medium.. | 50 | .. | 62¾ |
| 13 | Wisconsin Blue...... | ″ 27.. | ″ 30.. | 122 | Rank..... | 48 | 3 | Small ... | 50 | .. | 62½ |
| 14 | Trilby ............... | ″ 27.. | Sept. 2.. | 128 | ″ .... | 60 | 2½ | ″ .... | 49 | 40 | 62¼ |
| 15 | Black-eyed Marrowfat | ″ 24.. | ″ 1.. | 130 | Weak ... | 55 | 2 | Large .... | 48 | .. | 63¼ |
| 16 | White Wonder.. .... | ″ 25.. | Aug. 19.. | 116 | ″ .... | 29 | 2½ | Medium.. | 47 | 20 | 62½ |
| 17 | King........ ...... | ″ 27.. | ″ 29.. | 124 | Rank..... | 54 | 2 | ″ .. | 47 | .. | 63 |
| 18 | Prince Albert ...... | ″ 25.. | ″ 27.. | 129 | Fair...... | 56 | 2½ | Small . .. | 47 | .. | 62 |
| 19 | Arthur............. | ″ 25.. | ″ 27.. | 124 | Weak .... | 37 | 3 | Large .... | 46 | 40 | 63 |
| 20 | Picton............... | ″ 25.. | ″ 29.. | 126 | Fair.. .... | 48 | 3 | ″ .... | 46 | 40 | 63 |
| 21 | Kent ............... | ″ 25.. | Sept. 1.. | 129 | Rank..... | 41 | 2½ | ″ ... | 45 | 20 | 63½ |
| 22 | Mummy ..... ...... | ″ 27.. | Aug. 29.. | 124 | Fair...... | 45 | 2 | Small .... | 45 | 20 | 63 |
| 23 | Nelson............... | ″ 27.. | ″ 26.. | 121 | ″ .... | 43 | 2 | ″ .... | 44 | .. | 62½ |
| 24 | Large White Marowf't | ″ 24.. | ″ 30.. | 128 | Rank..... | 58 | 3 | Large .... | 43 | 40 | 63½ |
| 25 | Fergus .. . ...... | ″ 25.. | Sept. 2.. | 130 | ″ . .. | 55 | 3 | Small .... | 43 | 20 | 61½ |
| 26 | Elliot.... .......... | ″ 27.. | ″ 1.. | 127 | ″ .... | 60 | 3 | Large .... | 43 | 20 | 63 |
| 27 | Agnes ............. | ″ 25.. | Aug. 28.. | 125 | Weak .... | 41 | 3 | ″ .... | 43 | .. | 63¼ |
| 28 | Chancellor ........ ... | ″ 27.. | ″ 20.. | 115 | Fair... .. | 44 | 2 | Small .... | 41 | 40 | 62½ |
| 29 | Daniel O'Rourke.... | ″ 27.. | ″ 29 . | 124 | Medium.. | 65 | 3 | Medium.. | 41 | .. | 61½ |
| 30 | Paragon........... | ″ 25.. | Sept. 1.. | 129 | Fair..... | 43 | 2 | Small .... | 38 | 40 | 62½ |
| 31 | Prince............... | ″ 25.. | ″ 1.. | 129 | ″ .... | 55 | 2½ | Medium.. | 37 | .. | 63½ |
| 32 | Perth......... ... | ″ 25.. | Aug. 27.. | 124 | Weak .... | 51 | 3½ | Large ... | 36 | .. | 64 |
| 33 | Duke ............... | ″ 25.. | Sept. 1.. | 129 | Rank..... | 70 | 3 | ″ .... | 34 | 20 | 62¾ |
| 34 | Gregory. ........... | ″ 25.. | Aug. 29.. | 126 | ″ .... | 52 | 3 | Medium.. | 34 | 20 | 63 |
| 35 | Prussian Blue........ | ″ 25.. | ″ 27.. | 124 | ″ ... | 56 | 2¾ | ″ .. | 34 | .. | 63 |
| 36 | Carleton ............ | ″ 25.. | Sept. 2.. | 130 | ″ .... | 54 | 2 | ″ .. | 33 | 40 | 63 |
| 37 | New Potter.......... | ″ 27.. | Aug. 29.. | 124 | Fair.. ... | 48 | 2 | ″ .. | 31 | 40 | 62 |
| 38 | Bruce...... ........ | ″ 25.. | Sept. 1.. | 129 | ″ .... | 47 | 3 | Small .... | 28 | 20 | 62¾ |
| 39 | Centennial...... .... | ″ 27.. | ″ 1.. | 127 | Rank..... | 44 | 2½ | Medium.. | 27 | 40 | 62 |
| 40 | Lanark......... .. . | ″ 25.. | ″ 1.. | 129 | Medium.. | 38 | 3 | Large .... | 24 | .. | 62½ |

## FLAX—TEST OF VARIETIES.

The several varieties of flax tested last year were again sown this year.

Novarossick has again proved the most productive, closely followed by La Plata. Our common flax is very similar to the varieties from Russia, viz., Russian, Riga and St. Petersburg; but the other kinds given in the following table are quite distinct. La Plata is a late variety with wide-spreading branches, and unusually large seed; Novarossick is also a coarse plant, but ripens with common flax. Bombay is so short and unproductive that it is not worthy of cultivation.

The size of plots for this test was one-fortieth acre, and the soil was a clay loam which had been summer-fallowed except in the case of the last plot on the list.

### FLAX—TEST OF VARIETIES.

| Varieties. | Date Sown. | Date Ripe. | Length of Straw. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|
| | | | In. | Bush. | Lbs. | Lbs. |
| Novarossick | June 2 | Aug. 25 | 25 | 26 | 44 | 55½ |
| La Plata | " 2 | Sept. 1 | 25 | 20 | 40 | 46 |
| Common | " 2 | Aug. 25 | 31 | 19 | 36 | 55½ |
| Russian | " 2 | " 25 | 26 | 18 | 32 | 55½ |
| Riga | " 2 | " 25 | 28 | 13 | 32 | 53½ |
| St. Petersburg | " 2 | " 25 | 31 | 12 | 28 | 54½ |
| Bombay | " 2 | " 28 | 15 | 8 | 32 | 53 |
| Common on new breaking | " 2 | Sept. 1 | 25 | 19 | 6 | 55 |

### FLAX—THICK AND THIN SOWING.

Last year from 15 to 50 pounds of seed was used in this series of experiments, with the result that the yield increased in about the same ratio as the increase of seed.

This year much larger quantities of seed were used, but sixty pounds of seed gave a larger yield than any thicker sowing. The plots for this test were one-fortieth acre, and the soil a black loam, summer-fallowed.

All were harvested on September 3, 1903.

| Varieties. | Amount sown per Acre. | Date of Sowing. | Length of Straw. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|
| | Lbs. | | In. | Bush. | Lbs. | Lbs. |
| Common Flax | 40 | June 2 | 29 | 20 | 40 | 55 |
| " | 50 | " 2 | 29 | 18 | 32 | 55 |
| " | 60 | " 2 | 29 | 22 | 28 | 55 |
| " | 70 | " 2 | 29 | 21 | 4 | 55 |
| " | 80 | " 2 | 29 | 20 | 20 | 55 |
| " | 90 | " 2 | 29 | 19 | 36 | 55 |
| " | 100 | " 2 | 29 | 17 | 48 | 55 |

## EXPERIMENTS WITH INDIAN CORN.

The crop of Indian corn was heavier than usual this year, some of the plants being twelve feet high; but owing to lack of sunshine during midsummer it was not as well matured as usual, only five out of about twenty-five varieties reaching the late milk stage.

In addition to the test plots a field of Pearce's Prolific was grown for feeding purposes. About seventy-five tons of this corn was harvested with a corn binder and made into ensilage; the remainder was stooked in the field and will be drawn in as it is required and fed dry.

The seed was sown on May 28, in rows 30 inches apart, using about half a bushel of seed per acre. The crop was cut on September 4. Twenty-five varieties were under trial, the soil was a black sandy loam, and the previous crop was corn. The yields were calculated from two rows each 66 feet long.

## INDIAN CORN—TEST OF VARIETIES.

| Number. | Name of Variety. | Height — Inches. | When Tasselled. | In Silk. | Condition when cut Sept. 2. | Weight per Acre grown in rows. | | Weight per Acre grown in hills. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Eureka | 132 | Aug. 30 | | In tassel | 28 | 1,532 | 22 | 1,672 |
| 2 | Thoroughbred White Flint | 100 | " 26 | | " | 28 | 232 | 21 | 1,032 |
| 3 | Champion White Pearl | 108 | " 25 | | " | 24 | 312 | 18 | 960 |
| 4 | Superior Fodder | 85 | " 21 | Aug. 30 | In silk | 21 | 1,824 | 20 | 1,712 |
| 5 | Early Mastodon | 108 | " 20 | " 30 | " | 21 | 768 | 21 | 1,032 |
| 6 | Compton's Early | 116 | " 20 | " 22 | Early milk | 20 | 392 | 17 | 1,112 |
| 7 | Early Butler | 120 | " 24 | | In tassel | 19 | 1,336 | 17 | 320 |
| 8 | Red Cob Ensilage | 108 | " 26 | | " | 19 | 1,072 | 22 | 1,672 |
| 9 | Mammoth Cuban | 144 | " 22 | Sept. 1 | In silk | 19 | 1,072 | 18 | 432 |
| 10 | Angel of Midnight | 97 | " 18 | Aug. 24 | Early milk | 19 | 1,072 | 16 | 1,792 |
| 11 | Giant Prolific Ensilage | 110 | " 26 | | In tassel | 19 | 280 | 16 | 472 |
| 12 | Longfellow | 100 | " 11 | Aug. 20 | Early milk | 19 | 280 | 19 | 16 |
| 13 | King Philip | 96 | " 19 | " 25 | Late milk | 18 | 1,752 | 16 | 1,528 |
| 14 | White Cap Yellow Dent | 100 | " 22 | " 26 | Early milk | 18 | 1,752 | 15 | 1,680 |
| 15 | North Dakota White | 110 | " 12 | " 20 | Late milk | 18 | 960 | 16 | 1,528 |
| 16 | Selected Leaming | 109 | " 24 | " 30 | In silk | 18 | 432 | 15 | 1,680 |
| 17 | Sanford | 85 | " 18 | " 21 | Late milk | 16 | 1,000 | 15 | 1,680 |
| 18 | Cloud's Early Yellow | 120 | " 23 | " 30 | In silk | 16 | 472 | 13 | 1,192 |
| 19 | Squaw Corn | 91 | " 18 | " 22 | Late milk | 15 | 1,944 | 18 | 960 |
| 20 | Evergreen Sugar | 90 | " 25 | | In tassel | 15 | 1,680 | 13 | 400 |
| 21 | Pride of the North | 114 | " 20 | Aug. 27 | Early milk | 15 | 1,680 | 15 | 360 |
| 22 | Mammoth 8-rowed Flint | 106 | " 15 | " 25 | Late milk | 15 | 1,152 | 14 | 1,832 |
| 23 | King of the Earliest | 96 | " 21 | " 31 | In silk | 15 | 360 | 16 | 472 |
| 24 | Salzer's All Gold | 107 | " 22 | " 30 | " | 14 | 248 | 22 | 352 |
| 25 | North Dakota Yellow Flint | 95 | " 11 | " 20 | Early milk | 11 | 1,760 | 14 | 248 |

## INDIAN CORN—SOWN AT DIFFERENT DISTANCES APART.

| Name of Variety. | Distance apart. | Height. | Condition when cut. | Weight per Acre, cut green for ensilage, in rows. | |
|---|---|---|---|---|---|
| | Inches. | Inches. | | Tons. | Lbs. |
| Longfellow | 24 | 114 | Late milk | 18 | 300 |
| " | 30 | 114 | " | 14 | 1,832 |
| " | 36 | 114 | " | 15 | 800 |
| " | 42 | 114 | " | 11 | 275 |
| Selected Leaming | 24 | 120 | In silk | 19 | 1,600 |
| " " | 30 | 120 | " | 17 | 320 |
| " " | 36 | 120 | " | 18 | 960 |
| " " | 42 | 120 | " | 12 | 750 |
| Champion White Pearl | 24 | 116 | " | 21 | 900 |
| " " | 30 | 116 | " | 20 | 1,712 |
| " " | 36 | 116 | " | 19 | 1,600 |
| " " | 42 | 116 | " | 13 | 895 |

## INDIAN CORN.

| Average Yield at Different Distances Apart. | Tons. | Lbs. |
|---|---|---|
| Average yield of green corn at 24 inches apart | 19 | 1,600 |
| " " 30 " | 17 | 1,288 |
| " " 36 " | 17 | 1,786 |
| " " 42 " | 12 | 640 |

### POP-CORN.

Two varieties of pop-corn were grown, but neither of them matured grain before the frost. They were sown on June 3, and cut September 3.

The Early Amber Rice pop-corn reached the early milk stage, was 75 inches high, and yielded 14 tons 1,600 pounds of green fodder per acre.

The White Pearl pop-corn was only in silk when cut, and 80 inches high. It yielded 18 tons of green fodder per acre.

The size of each plot was one-twentieth acre, and the soil sandy loam, summer-fallowed.

## EXPERIMENTS WITH TURNIPS.

Twenty varieties of turnips have been on trial at the experimental farm this year. The yield was much above the average, and the quality excellent.

The soil chosen for this experiment was a sandy loam, and the previous crop potatoes. Ten loads of well rotted manure per acre were applied in the autumn of 1902, and ploughed under at once.

Two sowings were made of each variety; in every instance the early sown plots gave the largest return; in some instances the early sown plots yielded twice as much as the late sown ones.

The first plots were sown on May 30, the second on June 13, and the roots from both were pulled on October 7. The estimate of yield has been made from the product of two rows, each 66 feet long.

TURNIPS.—TEST OF VARIETIES.

| Number. | Name of Variety. | Character of Growth. | Yield per Acre.—1st Plot. | | Yield per Acre.—1st Plot. | | Yield per Acre.—2nd Plot. | | Yield per Acre.—2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Magnum Bonum | Strong | 43 | 1.120 | 1,452 | .. | 18 | 960 | 616 | .. |
| 2 | Drummond Purple Top | " | 42 | 480 | 1,408 | .. | 14 | 1,040 | 484 | .. |
| 3 | Mammoth Clyde | Weak | 41 | 1,160 | 1,386 | .. | 16 | 1,000 | 550 | .. |
| 4 | Elephants Master | Fair | 40 | 1,312 | 1,355 | 12 | 15 | 1,680 | 528 | .. |
| 5 | Selected Purple Top | Strong | 40 | 520 | 1,342 | .. | 16 | 736 | 545 | 36 |
| 6 | Skirvings | " | 40 | 520 | 1,342 | .. | 20 | 920 | 682 | .. |
| 7 | Imperial Swede | Fair | 40 | 520 | 1,342 | .. | 19 | 1,600 | 660 | .. |
| 8 | Kangaroo | Strong | 39 | 1,200 | 1,320 | .. | 17 | 320 | 572 | .. |
| 9 | Sutton's Champion | Fair | 39 | 1,200 | 1,320 | .. | 15 | 360 | 506 | .. |
| 10 | Hall's Westbury | Strong | 39 | 1,200 | 1,320 | .. | 21 | 240 | 704 | .. |
| 11 | New Century | " | 39 | 672 | 1,311 | 12 | 14 | 1,040 | 484 | .. |
| 12 | Halewood's Bronze Top | " | 38 | 1,880 | 1,298 | .. | 17 | 320 | 572 | .. |
| 13 | Emperor Swede | Fair | 38 | 560 | 1,276 | .. | 14 | 1,568 | 492 | 48 |
| 14 | Hartley's Bronze | " | 38 | 560 | 1,276 | .. | 22 | 880 | 748 | .. |
| 15 | East Lothian | Strong | 36 | 1,920 | 1,232 | .. | 15 | 1,680 | 528 | .. |
| 16 | Good Luck | Fair | 36 | 864 | 1,214 | 24 | 14 | 1,040 | 484 | .. |
| 17 | Shamrock Purple Top | " | 36 | 600 | 1,210 | .. | 19 | 280 | 638 | .. |
| 18 | Perfection Swede | Weak | 35 | 1,280 | 1,188 | .. | 16 | 1,000 | 550 | .. |
| 16 | Bangholm Selected | Fair | 34 | 1,960 | 1,166 | .. | 15 | 360 | 506 | .. |
| 20 | Jumbo | Strong | 32 | 680 | 1,078 | .. | 16 | 1,000 | 550 | .. |

## EXPERIMENTS WITH MANGELS.

Sixteen varieties of these useful field roots were tested this year; the yield was above the average and the quality good.

Mangels are found to be one of the most serviceable field roots grown on the farm; all animals are partial to them, even chickens will consume a large quantity of them during the winter months.

About the only objection to their cultivation is the risk from injury from early fall frosts.

The soil chosen for this crop was a sandy loam fertilized the previous year with ten loads per acre of barn-yard manure; the previous crop was potatoes.

The first plots were sown on May 30, and the second on June 13; all were harvested on September 21.

The estimate of yield has been made from the product of two rows, each 66 feet long.

MANGELS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. — 1st Plot. | | Yield per Acre. — 1st Plot. | | Yield per Acre. — 2nd Plot. | | Yield per Acre. — 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Mammoth Long Red | 42 | 744 | 1,412 | 24 | 23 | 1,520 | 792 | .. |
| 2 | Half Long Sugar White | 36 | 1,392 | 1,223 | 12 | 28 | 760 | 946 | .. |
| 3 | Triumph Yellow Globe | 36 | 1,584 | 1,126 | 24 | 20 | 656 | 677 | 36 |
| 4 | Mammoth Yellow Intermediate | 33 | 1,320 | 1,122 | .. | 24 | 1,368 | 822 | 48 |
| 5 | Selected Mammoth Long Red | 32 | 1,736 | 1,095 | 36 | 23 | 1,784 | 796 | 24 |
| 6 | Prize Mammoth Long Red | 32 | 1,472 | 1,091 | 12 | 22 | 88 | 734 | 48 |
| 7 | Prize Winner Yellow Globe | 31 | 1,360 | 1,056 | .. | 21 | 1,560 | 726 | .. |
| 8 | Yellow Intermediate | 30 | 720 | 1,012 | .. | 20 | 712 | 695 | 12 |
| 9 | Lion Yellow Intermediate | 29 | 1,400 | 990 | .. | 22 | 880 | 748 | .. |
| 10 | Leviathan Long Red | 28 | 232 | 937 | 12 | 18 | 960 | 616 | .. |
| 11 | Gate Post | 27 | 1,968 | 932 | 48 | 23 | 200 | 770 | .. |
| 12 | Selected Yellow Globe | 27 | 1,704 | 928 | 24 | 23 | 728 | 778 | 48 |
| 13 | Giant Sugar Mangel | 27 | 912 | 915 | 12 | 20 | 1,712 | 695 | 12 |
| 14 | Half Long Sugar Rosy | 27 | 912 | 915 | 12 | 20 | 1,712 | 695 | 12 |
| 15 | Giant Yellow Globe | 25 | 1,480 | 858 | .. | 21 | 1,560 | 726 | .. |
| 16 | Giant Yellow Intermediate | 25 | 160 | 836 | .. | 23 | 992 | 783 | 12 |

## EXPERIMENTS WITH CARROTS.

The soil selected for this crop was not a suitable one, being too stiff and hard, giving the roots little opportunity of penetrating it.

Eleven varieties were tried; the first sowing was made on May 16 and the second on June 6. With one exception, all the first sown plots gave the largest yield.

The soil was a stiff clay loam, which had been summer-fallowed; all were pulled on October 19.

The yield per acre has been calculated from the product of two rows, each 66 feet long

CARROTS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. — 1st Plot. | | Yield per Acre. — 1st Plot. | | Yield per Acre. — 2nd Plot. | | Yield per Acre. — 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Improved Short White | 22 | 1,320 | 755 | 20 | 12 | 640 | 410 | 40 |
| 2 | New White Intermediate | 21 | 240 | 704 | .. | 10 | 900 | 348 | 20 |
| 3 | Ontario Champion | 21 | 240 | 704 | .. | 11 | 1,760 | 396 | .. |
| 4 | White Belgian | 17 | 1,640 | 594 | .. | 10 | 1,780 | 363 | .. |
| 5 | Half Long Chantenay | 17 | 320 | 572 | .. | 10 | 1,120 | 352 | .. |
| 6 | Half Long White | 16 | 1,440 | 557 | 20 | 8 | 720 | 278 | 40 |
| 7 | Giant White Vosges | 15 | 1,680 | 528 | .. | 12 | 1,300 | 421 | 40 |
| 8 | Mammoth White Intermediate | 14 | 1,700 | 495 | .. | 8 | 60 | 267 | 40 |
| 9 | Early Gem | 14 | 600 | 443 | 20 | 11 | 1,320 | 388 | 40 |
| 10 | Carter's Orange Giant | 11 | 880 | 381 | 20 | 9 | 1,890 | 330 | .. |
| 11 | Long Yellow Stump Rooted | 10 | 900 | 348 | 20 | 11 | 1,320 | 388 | 40 |

## EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were on trial this year; the soil was a sandy loam, on which a crop of potatoes was grown in 1902; the soil was fertilized with ten loads per acre of barn-yard manure in the fall of 1902.

The first plots were sown on June 1, and the second on June 15. All were pulled September 21.

The yield has been calculated from two rows, each 66 feet long.

SUGAR BEETS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. — 1st Plot. | | Yield per Acre. — 1st Plot. | | Yield per Acre. — 2nd Plot. | | Yield per Acre. — 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Danish Red Top | 25 | 160 | 836 | .. | 19 | 1,660 | 660 | .. |
| 2 | Red Top Sugar | 24 | 312 | 805 | 12 | 20 | 920 | 682 | .. |
| 3 | Danish Improved | 23 | 464 | 774 | 24 | 16 | 1,000 | 550 | .. |
| 4 | Improved Imperial | 22 | 1,936 | 765 | 36 | 21 | 504 | 708 | 24 |
| 5 | Wanzleben | 20 | 128 | 668 | 48 | 15 | 360 | 506 | .. |
| 6 | Royal Giant | 19 | 1,600 | 660 | .. | 21 | 504 | 708 | 24 |
| 7 | French "Very Rich" | 13 | 1,720 | 462 | .. | 13 | 1,720 | 462 | .. |
| 8 | Vilmorin's Improved | 13 | 1,456 | 457 | 36 | 14 | 776 | 479 | 36 |

## EXPERIMENTS WITH POTATOES.

Fifty-six varieties of potatoes were under trial this year; the season was a favourable one. The yield was large and the quality excellent.

On this farm the following system of cultivation has given excellent yields of potatoes, with the minimum amount of labour, and leaves the field to a large extent free of weeds.

Stubble land is ploughed deep and as early in spring as possible; this is harrowed at once, and again as the weeds germinate, until about May 20, when the field is rolled and ploughed shallow, the potatoes being planted in every third furrow. The land is then harrowed every few days until the potato plants are three inches high; by this plan little or no hoeing is necessary, and good yields are assured.

The soil selected this year was a stiff clay loam, and the previous crop was mangels. The potatoes were planted on May 21 and dug October 16 and 17. There was no injury from rot; the yield has been estimated in each case from the product of one row 66 feet long.

POTATOES—TEST OF VARIETIES.

| Number. | Name of Variety. | Character of Growth. | Average Size. | Total yield per acre. | | Yield per acre of Marketable. | | Yield per acre of unmarketable. | | Form and Colour. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Bush. | Lbs. | Bush. | Lbs. | Bush. | Lbs. | |
| 1 | General Gordon | Rank | Medium to large. | 630 | 40 | 539 | .. | 91 | 40 | Long round deep pink |
| 2 | Delaware | V. rank. | " " | 586 | 40 | 535 | 20 | 51 | 20 | Long, oval, white. |
| 3 | Enormous | " | Medium | 509 | 40 | 440 | .. | 69 | 40 | Roundish, white. |
| 4 | Uncle Sam | " | Medium to large | 498 | 40 | 462 | .. | 36 | 40 | Flattish, oval, white. |
| 5 | American Wonder | " | Large | 495 | . | 462 | . | 33 | .. | Long. round, white. |
| 6 | Seedling No. 7 | " | Medium to large | 487 | 40 | 439 | .. | 58 | 40 | Long, deep red. |
| 7 | Irish Daisy | Fair | " " | 484 | .. | 432 | 40 | 51 | 20 | Long, oval, white. |
| 8 | State of Maine | Rank | Small to medium | 484 | .. | 432 | 40 | 51 | 20 | Flat, oval, white. |
| 9 | Money Maker | Fair | " " | 480 | 20 | 429 | .. | 51 | 20 | Round, oval, white. |
| 10 | Canadian Beauty | Rank | Medium to large | 469 | 20 | 436 | 20 | 33 | .. | Long, round, l't pink. |
| 11 | Cambridge Russet | Fair | " " | 465 | 40 | 429 | .. | 36 | 40 | " " dp russet |
| 12 | Early Puritan | Rank | " " | 462 | .. | 429 | .. | 33 | .. | " " white. |
| 13 | Early Norther | Fair | " " | 462 | .. | 403 | 20 | 58 | 40 | " flat, pink. |
| 14 | Green Mountain | Rank | Small to medium | 451 | .. | 414 | 20 | 36 | 40 | Flat, oval, white. |
| 15 | Reeve's Rose | " | Medium to large | 451 | .. | 432 | 40 | 18 | 20 | Flat, oval, light pink. |
| 16 | Empire State | " | " " | 451 | .. | 429 | .. | 22 | .. | Long, white. |
| 17 | Brown's Rot Proof | Fair | " " | 447 | 20 | 414 | 20 | 33 | .. | Round oval deep pink |
| 18 | Country Gentlemen | " | " " | 447 | 20 | 407 | .. | 40 | 20 | Long, deep pink. |
| 19 | Irish Cobbler | " | " " | 447 | 20 | 392 | 20 | 55 | .. | Flat, white. |
| 20 | Everett | Rank | " " | 447 | 20 | 407 | .. | 40 | 20 | Long, oval, pink. |
| 21 | Rose of the North | " | " " | 440 | .. | 403 | 20 | 36 | 40 | Round, oval, l't pink. |
| 22 | Rawdon Rose | Fair | Small to medium | 440 | .. | 399 | 40 | 40 | 20 | " " " |
| 23 | Maule's Thor'ghbred | Rank | Medium to large | 440 | .. | 344 | 40 | 95 | 20 | Long, deep, pink. |
| 24 | Holborn Abundance | " | " " | 436 | 20 | 418 | .. | 18 | 20 | Round, white. |
| 25 | Lee's Favourite | Weak | Small to medium | 432 | 40 | 392 | 20 | 40 | 20 | Long, oval, light pink |
| 26 | Late Puritan | Rank | Medium to large | 430 | 50 | 388 | 40 | 42 | 10 | Long, round, white. |
| 27 | Rose No. 9 | " | " " | 429 | .. | 396 | .. | 33 | .. | Long, flat, deep pink |
| 28 | Burnaby Seedling | " | " " | 429 | .. | 414 | 20 | 14 | 40 | Flat, oval, pink. |
| 29 | Sharpe's Seedling | Fair | " " | 425 | 20 | 381 | 20 | 44 | . | Long, oval, l't pink. |
| 30 | Vanier | Rank | Small to medium | 425 | 20 | 385 | .. | 40 | 20 | Round, oval, pink. |
| 31 | Early White Prize | Fair | Medium to large | 418 | .. | 385 | .. | 33 | .. | Round, oval, l't pink |
| 32 | Prolific Rose | " | " " | 418 | .. | 396 | .. | 22 | .. | Round, deep pink. |
| 33 | Swiss Snowflake | Rank | Small to medium | 414 | 20 | 396 | . | 18 | 20 | Irregular, white. |
| 34 | American Giant | " | Medium to large | 414 | 20 | 381 | 20 | 33 | .. | Round, oval, white. |
| 35 | Dreer's Standard | " | " " | 414 | 20 | 381 | 20 | 33 | .. | Flattish, oval, white. |
| 36 | I. X. L. | " | " " | 414 | 20 | 377 | 40 | 36 | 40 | Long, round, pink. |
| 37 | Early Michigan | Fair | " " | 410 | 40 | 366 | 40 | 44 | .. | Long, white. |
| 38 | Penn Manor | Rank | " " | 407 | .. | 355 | 40 | 51 | 20 | Long, oval, deep pink |
| 39 | Pearce | " | " " | 407 | .. | 374 | .. | 33 | .. | Round, pink. |
| 40 | Carman, No. 1 | Fair | " " | 399 | 40 | 370 | 20 | 29 | 20 | Flat, white. |
| 41 | McIntyre | Rank | " " | 388 | 40 | 363 | .. | 25 | 40 | Long, round, white. |
| 42 | Carman No. 3 | Fair | " " | 381 | 20 | 348 | 20 | 33 | .. | " " " |
| 43 | Early Sunrise | " | Large | 377 | 40 | 341 | .. | 36 | 40 | Long, oval, l't pink. |
| 44 | Troy Seedling | Rank | Small to medium | 377 | 40 | 355 | 40 | 22 | .. | Irregular, white. |
| 45 | Sabean's Elephant | " | Medium to large | 366 | 40 | 341 | .. | 25 | 40 | Long, round, white. |
| 46 | Early Andes | Fair | Small to medium | 363 | .. | 330 | .. | 33 | .. | Round, oval, white. |
| 47 | Clay Rose | Rank | Medium to large | 355 | 40 | 308 | .. | 47 | 40 | Flat, oval, deep pink |
| 48 | Rochester Rose | Weak | Small to medium | 341 | .. | 308 | .. | 33 | .. | Long, round, l't pink |
| 49 | Early Rose | Fair | " " | 335 | 30 | 251 | 10 | 84 | 20 | Round, pink. |
| 50 | Early St. George | " | Medium to large | 330 | .. | 297 | .. | 33 | .. | Long, oval, deep pink |
| 51 | Bovee | " | " " | 319 | .. | 282 | 20 | 36 | 40 | Long, oval, l't pink. |
| 52 | Vicks Extra Early | " | Small to medium | 315 | 20 | 289 | 40 | 25 | 40 | Flat, pink. |
| 53 | Burpee's Extra Early | Weak | Medium to large | 311 | 40 | 297 | .. | 14 | 40 | Oval pink. |
| 54 | Early Envoy | Fair | " " | 271 | 20 | 253 | .. | 18 | 20 | Round pink. |
| 55 | Up To Date | Rank | Small to medium | 258 | 30 | 232 | 50 | 25 | 40 | Flat, white. |
| 56 | Pingree | Weak | " " | 113 | 40 | 106 | 20 | 7 | 20 | Flat, oval, white. |

## GRASSES.

Owing to the very dry weather in June, the yield of grasses is below the average this year.

A new variety, *Bromus Arvensis*, was on trial for the first time this year. It is a biennial with a very handsome panicle; its suitability for feeding purposes has not yet been tested on this farm. The grasses were sown on spring-ploughed stubble, without a nurse crop. Size of plots, one-twentieth acre; soil, a sandy loam.

| Varieties. | When sown. | Seed per Acre. | Yield of Hay per Acre. | |
|---|---|---|---|---|
| | | Lbs. | Tons. | Lbs. |
| Austrian Brome (*Bromus inermis*) | 1900 | 12 | 2 | —— |
| " " ( " " ) | 1902 | 12 | 1 | 300 |
| Field Brome (*Bromus Arvensis*) | 1902 | 12 | 1 | 900 |
| Hard Fescue | 1900 | 10 | 1 | 1,850 |
| Western Rye Grass (*A. tenerum*) | 1902 | 12 | 1 | 220 |
| Wheat Grass (*E. Virginicus*) | 1902 | 12 | — | 1,500 |

## EXPERIMENTS WITH CLOVERS.

As usual, a number of the hardiest clovers have wintered here, and given a fair return of fodder. The plan usually followed in the eastern provinces of sowing clover seed with a nurse crop of grain has always proved a failure on this farm, our heavy crops of grain so completely shade the ground that the clover plant has no opportunity of developing and is too small and weak to withstand the severe winter.

The system adopted here is to plough grain stubble land late in May or early in June, harrow once, sow the clover seed broadcast, then harrow a second time and roll, when the weeds and volunteer crop is about one foot high a mower is run over the land and the cuttings left on the ground as a mulch. By autumn the clover plants are, by this plan, commonly about two feet high, well rooted, and they usually pass the winter without loss.

Red Clover will give a paying crop for about three years without resowing. Alfalfa can be cut twice in a season but the other clovers only once.

Crimson Clover has been found too tender for this climate. Sweet or Bokhara Clover is hardy and a rank grower, but the plant is of little use for fodder purposes.

Test of varieties sown May, 1902, on spring ploughed wheat stubble, size of plots one-twentieth acre, soil sandy loam.

| Varieties. | Seed per Acre. | Aftermath thickness. | Yield of Hay per Acre. | |
|---|---|---|---|---|
| | Lbs. | | Tons. | Lbs. |
| Mammoth Red | 20 | Fair | 2 | 700 |
| Common Red | 20 | Thick | 1 | 1,600 |
| Alfalfa, 1st cutting | 25 | " | 2 | 1,000 |
| " 2nd " | 25 | " | 1 | 500 |
| Alsike | 20 | Thin | | 1,800 |
| White Dutch | 20 | Very thin | Not weighed | |

## MILLETS.

Under proper treatment several varieties of millet have proved very satisfactory on this farm. The early maturing and finer strawed kinds have been the most successful, such as Common Millet, Hungarian Grass, German Millet and Golden Millet.

Common Millet is the only variety that will ripen its seed here every year. Much of the imported seed is mixed with the seed of wild mustard, but if a small plot is sown with the imported seed and the noxious weeds pulled by hand, pure seed can be obtained for future use. It has not been found advisable to feed millet in large quantities to horses, but during the past winter the work horses on this farm were each fed one sheaf of common millet each day, with excellent results. For this purpose the crop should be cut directly it is in the head, and before the seed has fully formed.

Millet seed is small and the germ rather feeble, and for that reason it should be sown only in well pulverized and moist loam; hard clay, gumbo, dry sandy or gravelly soils are not suitable for it.

Summer-fallowed land or the first crop after field roots makes a good preparation for Millets, and from May 20 to June 15 is the proper time to sow them.

The size of the plots for this test were one-fortieth acre and the soil was a rich sandy loam which had been summer-fallowed; all were sown on June 3 and cut on September 3.

MILLETS.

| Varieties. | Height. | Length of Head. | Stage when Cut. | Yield per Acre of Hay. | |
|---|---|---|---|---|---|
| | Inches. | Inches. | | Tons. | Lbs. |
| Algerian or Early Pearl | 75 | 5 | Fully headed | 5 | 1,600 |
| Moha Hungarian | 45 | 5 | " | 5 | 600 |
| Italian or Indian | 43 | None. | Not headed | 4 | 1,000 |
| Round French | 63 | 8 | Nearly ripe | 3 | 600 |
| Pearl or Cat-tail | 30 | None. | Not headed | 3 | 400 |
| Common Millet | 39 | 4 | Nearly ripe | 2 | 800 |
| Red Orenburg | 47 | 6 | Fully headed | 2 | 600 |

## HORSE BEANS AND SUNFLOWERS.

A one-twentieth acre plot of each of these plants were grown, but the frost of September 3 and 4 injured them so severely that they were not worth cutting.

## CATTLE.

The herd of cattle on the Brandon experimental farm now consists of the following animals:—

| Name of Animal. | Breed. | Age. | Weight. |
|---|---|---|---|
| | | | Lbs. |
| Red Knight of Brandon | Shorthorn | 19 months | 1,210 |
| Brandon Myrtle | " | 4 years | 1,595 |
| Nancy | " | 3 " | 1,240 |
| Alice May | " | 3 " | 1,420 |
| Rose of Brandon | " | 5 months | 465 |
| Haron | Ayrshire | 7 " | 550 |
| Lily of Brandon | " | 19 " | 865 |
| Denty | " | 19 " | 760 |
| Ottawa Prince | Guernsey | 21 " | 1,090 |
| Brandon's Maid | " | 2 years | 965 |
| Christie | Shorthorn-grade | 6 " | 1,365 |
| Gretchen | " | 5 " | 1,355 |
| Carrie | " | 8 " | 1,420 |
| Jennette | " | 7 " | 1,290 |
| Jenny | " | 3 months | 270 |
| Pet | Ayrshire-grade | 6 years | 925 |
| Sis | " | 5 months | 370 |

## EXPERIMENTS IN FEEDING STEERS.

### BROME GRASS COMPARED WITH FODDER CORN.

Of the ten steers selected for this test, two were Aberdeen Angus grades, and the balance Shorthorn grades; all were two and one-half years old when the test began.

When purchased in November, 1902, the steers cost $3.50 per hundred pounds live weight, and they sold in April, 1903, for $4.25 per hundred; both lots were then choice export cattle.

After two weeks of preparatory feeding, they were divided into two uniform groups. All were tied in double stalls and fed all they would eat of the following rations:—

### *Ration fed Group No. 1.*

During the first four weeks, December 12, 1902, to January 9, 1903, each steer received per day—

| | Pounds. |
|---|---|
| Brome hay | 20 |
| Turnips | 10 |
| Chop | 6 |
| Bran | 5 |

During the second four weeks, January 9 to February 6, 1903, each steer received per day—

| | Pounds. |
|---|---|
| Brome hay | 20 |
| Turnips | 7 |
| Chop | 7 |
| Bran | 5 |

During the third four weeks, February 6 to March 6, 1903, each steer received per day—

| | Pounds. |
|---|---|
| Brome hay | 20 |
| Turnips | 7 |
| Chop | 8 |
| Bran | 5 |

During the fourth four weeks, March 6 to April 3, 1903, each steer received per day—

| | Pounds. |
|---|---|
| Brome hay | 20 |
| Turnips | 7 |
| Chop | 9 |
| Bran | 5 |

### *Ration fed Group No. 2.*

During the first four weeks, December 12, 1902, to January 9, 1903, each steer received per day—

| | Pounds. |
|---|---|
| Fodder corn | 24 |
| Turnips | 10 |
| Chop | 6 |
| Bran | 5 |

During the second four weeks, January 9, to February 6, 1903, each steer received per day—

| | Pounds. |
|---|---|
| Fodder corn | 26 |
| Turnips | 7 |
| Chop | 7 |
| Bran | 5 |

During the third four weeks, February 6 to March 6, 1903, each steer received per day—

| | Pounds. |
|---|---|
| Fodder corn | 30 |
| Turnips | 10 |
| Chop | 8 |
| Bran | 5 |

During the fourth four weeks, March 6, to April 3, 1903, each steer received per day—

| | Pounds. |
|---|---|
| Fodder corn | 30 |
| Turnips | 10 |
| Chop | 9 |
| Bran | 5 |

### DESCRIPTION OF FODDER.

The brome was cut early and well cured.

The fodder corn was Pearce's Prolific, cut when in the late milk stage, well cured in the stooks outside and only drawn in as it was wanted. The chop consisted of one-third each of wheat screenings, oats and barley.

### COMPARATIVE GAINS.

| Brome Grass Hay. | Date. | Weight. | Gain. | Total Gain. |
|---|---|---|---|---|
| Original weight of steers | Dec 12, 1902 | 6,030 lbs | | |
| Weight at end of 1st period | Jan. 9, 1903 | 6,205 " | 175 lbs | |
| " 2nd " | Feb. 6, 1903 | 6,490 " | 285 " | |
| " 3rd " | March 6, 1903 | 6,810 " | 320 " | |
| " 4th " | April 3, 1903 | 6,965 " | 155 " | 935 lbs. |

| Fodder Corn. | Date. | Weight. | Gain. | Total Gain |
|---|---|---|---|---|
| Original weight of steers | Dec. 12, 1902 | 6,000 lbs | | |
| Weight at end of 1st period | Jan. 9, 1903 | 6,210 " | 210 lbs | |
| " 2nd " | Feb. 6, 1903 | 6,505 " | 295 " | |
| " 3rd " | March 6, 1903 | 6,810 " | 305 " | |
| " 4th " | April 3, 1903 | 7,010 " | 200 " | 1,010 lbs. |

COST OF FEEDING.

### *Lot No. 1.—Brome Grass Hay.*

| | |
|---|---|
| 11,200 pounds of hay at $5 per ton. . . . . . . . . . . . . . . . . . | $28 00 |
| 79 bushels of turnips at 5c. per bushel. . . . . . . . . . . . . . | 3 96 |
| 4,200 pounds of chop at 75c. per 100 pounds. . . . . . . . . . | 31 50 |
| 2,800 pounds of bran at $12 per ton. . . . . . . . . . . . . . . . . . | 16 80 |
| Total cost of five steers. . . . . . . . . . . . . . . . . . | $80 26 |
| Cost of one steer. . . . . . . . . . . . . . . . . . . . . . | $16 05 |

### *Lot No. 2.—Fodder Corn.*

| | |
|---|---|
| 16,050 pounds of fodder corn at $4 per ton. . . . . . . . . . . . | $32 10 |
| 79 bushels of turnips at 5c. per bushel. . . . . . . . . . . . . . | 3 96 |
| 4,200 pounds of chop at 75c. per 100 pounds. . . . . . . . . . | 31 50 |
| 2,800 pounds of bran at $12 per ton. . . . . . . . . . . . . . . . . | 16 80 |
| Total cost for five steers. . . . . . . . . . . . . . . . . . . . | $84 36 |
| Cost for one steer. . . . . . . . . . . . . . . . . . . . . . . | $16 87 |

SUMMARY OF RESULTS.

| — | First Cost per Steer. | Value of Feed consumed. | Price per Steer sold for. | Gain per day. | Profit per Steer. |
|---|---|---|---|---|---|
| | $ cts. | $ cts. | $ cts. | Lbs. oz. | $ cts. |
| Brome Grass Hay . . . . . . . . . . . . . . . | 42 51 | 16 05 | 59 20 | 1 10 | 0 64 |
| Fodder Corn . . . . . . . . . . . . . . . . . . . . . . | 42 00 | 16 87 | 59 58 | 1 12 | 0 71 |

CONCLUSIONS.

The results of this experiment would lead us to the following conclusions:—

First, that there is very little profit in feeding steers when the difference between the buying and selling price is only about 75 cents per steer.

Second, that cattle require more pounds of fodder corn per day than they do of brome grass hay.

Third, that the comparative value of these two fodder crops is about $4 per ton for fodder corn and $5 for brome hay.

## EXPERIMENTS WITH SWINE.

### SPELTZ (EMMER) COMPARED WITH MIXED GRAIN.

The area sown with speltz in this province has increased very largely during the past year, but very little is known of its value as a pig feed.

Eight pigs were used for this test, two Yorkshires and two Berkshires in each group.

The mixed grain used was composed of one-fifth oats, two-fifths wheat screenings, and two-fifths barley; both it and the speltz were ground and fed.

Both kinds of feed were valued at 75c. per hundred pounds. Reports have been received of injury to young pigs from feeding speltz, but no difficulty was experienced from this cause here.

At the close of the test the pigs were sold at $5.25 per hundred pounds, live weight.

### RATION FED.

Amount and value of food consumed during the fattening term of 81 days from January 15 to April 9, 1903 :—

| —— | Grain fed. | Value of feed. |
|---|---|---|
| | Lbs. | $ cts. |
| Pen 1, fed speltz | 1,525 | 11 43 |
| Pen 2, fed mixed grain | 1,550 | 11 62 |

### SUMMARY.

| —— | Weight when bought. | Value when bought. | Weight when sold. | Value when sold. | Value of food. | Profit on each pen. |
|---|---|---|---|---|---|---|
| | Lbs. | $ cts. | Lbs. | $ cts. | $ cts. | $ cts. |
| Pen 1, fed speltz | 432 | 22 68 | 821 | 43 10 | 11 43 | 8 99 |
| Pen 2, fed mixed grain | 402 | 21 10 | 809 | 42 47 | 11 62 | 9 75 |

### CONCLUSIONS.

First, the pen of animals fed on mixed grain consumed 25 pounds more grain during the fattening period than those fed on speltz.

Second, the same pen also made a gain of 18 pounds more than those fed on speltz.

Third, the amount of profit was practically the same from each class of food, the difference being only 76c. per pen in favour of the mixed grain ration.

## POULTRY.

Three breeds of poultry have been kept on this farm during the year, namely, Barred Plymouth Rocks, White Wyandottes and Light Brahmas. All have kept quite healthy and seventy-three chicks were raised during the summer.

### INCUBATOR.

A trial was made this year with an incubator, as this is the first year it has been tried on the farm, and the operator inexeprienced, it was deemed advisable to await the results of another year's test before reporting on its success.

### FATTENING OF BARRED PLYMOUTH ROCKS COMPARED WITH WHITE WYANDOTTES.

Four Barred Plymouth Rock cockerels and an equal number of White Wyandottes were shut up in slatted pens each 2 x 3 feet, and fed all they would eat of finely ground grain consisting of one-third each of wheat, oats and barley. This was given in troughs mixed with skim-milk to the consistency of thin porridge.

In the following tables the meal has been estimated at 75 cents per hundred pounds. The fattening period covered 28 days.

*Barred Plymouth Rocks.*

| Weight Nov. 25. | | Weight Dec. 23. | | Gain. | | Cost of food. | | Cost per lb. live weight. |
|---|---|---|---|---|---|---|---|---|
| Lbs. | oz. | Lbs. | oz. | Lbs. | oz. | $ | cts | cts. |
| 19 | 00 | 24 | 8 | 5 | 8 | 0 | 22 | 4 |

*Wyandottes (white).*

| Weight Nov. 25. | | Weight Dec. 23. | | Gain. | | Cost of food. | | Cost per lb. live weight. |
|---|---|---|---|---|---|---|---|---|
| Lbs. | oz. | Lbs. | oz. | Lbs. | oz. | $ | cts. | cts. |
| 17 | 10 | 21 | 10 | 4 | 00 | 0 | 21 | 5¼ |

SUMMARY.

First. The pen of Barred Plymouth Rocks consumed one and one-half pounds more grain during the fattening period than the White Wyandottes.

Second. The Barred Plymouth Rocks gained one and one-half pounds more flesh during the month, and the cost of the added flesh was one and one-quarter cents per pound less than in the case of the White Wyandottes.

## BEES.

The colonies of bees were removed from the cellar to their summer stands on April 4, ten days earlier than usual; of the twelve hives placed in the cellar last fall one died from inadequate stores.

A large number of farmers in this province are starting in bee-keeping.

For this reason the apiary was run for swarms more than for honey and still the demands for colonies could not be met. Some of the colonies were shipped long distances; this gave opportunity for the testing of different ways of packing hives for shipment; some of the plans tried proved disastrous to both comb and bees.

The most successful shipping was accomplished with the Langstroth hive, as follows: The reversible bottom board is placed so as to give the largest possible entrance which, with this hive is seven-eighth inches. This entrance is then covered with mosquito wire netting. A piece of comb section is placed on each corner of the hive body just under the cover; this raises the cover just enough to permit of ventilation, but not enough to allow the escape of bees. Malleable bale wire is then wrapped around the hive and twisted tight to keep the cover and bottom board firmly attached to the hive. By the above plan colonies have invariably reached their destination safely.

A trial was made this year of growing two different plants, as bee food, namely, Sweet Clover (Melitotus Alba) and Borage, the sweet clover is a biennial, and during the second summer blooms freely and continuously until frost. Bees are very partial to it, and the yield of nectar is large.

Borage is an annual garden herb, with bright blue flowers, which are very abundant throughout the summer. The plot of one-twentieth acre grown on the farm this year was fairly swarming with bees every bright day, and apparently the yield of honey from it is considerable.

Thirteen colonies were placed in the cellar on November 13, 1903.

## HORTICULTURE.

The season of 1903 was a very favourable one from a horticultural standpoint. The total absence of spring frosts contributed to a very heavy setting of fruits, and the generous rains throughout the season materially assisted in producing one of the best crops of fruit and vegetables of recent years.

A very large crop of crab-apples and plums were harvested, the yield from these being one of the heaviest recorded on the experimental farm; while raspberries and currants also gave fair returns.

The vegetable garden was very satisfactory, all varieties giving an exceptionally heavy yield of excellent quality.

Only one serious check was experienced during the season and this, fortunately, was near the close. On September 12, we were visited by a severe snow storm, accompanied by much wind, after which the thermometer registered 10° of frost, which damaged the late ripening vegetables as well as the later ripening varieties of cross-bred apples.

The bright weather experienced during the spring months was very favourable to hot-bed work, and exceptionally strong flowering plants were available at transplanting time, the flower garden presenting a mass of colour throughout the season.

Following will be found the results of portions of the work undertaken in this department.

### STANDARD APPLES.

The following standard apples grafted on Pyrus baccata, together with some Russian seedlings, were received from the Central Experimental Farm at Ottawa and planted here during the past season:—

Hibernal.
Wealthy.
North-west Greening.
McMahon White.
Longfield.
Russian Seedling, No. 18.
Russian Seedling, No. 22.
Russian Seedling, No. 7.
Russian Seedling, No. 3.
Russian Seedling, No. 26.
Yellow Transparent.
Pointed Pipka.
Duchess of Oldenburgh.
Scott's Winter.
McIntosh Red.

All became well established before the winter set in.

### APPLES (PYRUS BACCATA).

Although a heavy crop of fruit of the several varieties of Pyrus baccata was harvested last year, we were again favoured with an enormous crop during the present season. Of these the largest were the Pyrus baccata sanguinea, Pyrus baccata xanthocarpa, Pyrus baccata yellow, Pyrus —— No. 529. These made excellent preserves when cooked whole, while the smaller ones were unexcelled for jelly.

### SEEDLINGS OF THE MARTHA CRAB.

A considerable number of these seedlings fruited for the first time this season, among which were some excellent varieties. The best of these will be propagated for distribution by grafting on roots of Pyrus baccata.

### GRAFTING

In the spring of 1902, scions of the following varieties were grafted on Pyrus baccata:—

Transcendent.
Pride of Minneapolis.
Wealthy.
Duchess of Oldenburgh.

Excellent unions were made in all cases, and the following shows the condition of the scions after having passed through one winter.

Transcendent.—100 per cent alive to tips.
Pride of Minneapolis.—100 per cent alive to tips.
Wealthy.—All killed back three-fourths.

Duchess.—50 per cent killed back three-fourths. Balance alive to tips.

The scions that came through in good condition made splendid growth during the present season, and their condition will be reported upon next year. In connection with the Duchess of Oldenburgh, we desire to state, that the percentage of scions of this variety which wintered successfully, was greatly reduced by reason of the fact that two of the *Pyrus baccata* on which these were grafted, afterwards died and were destroyed.

### ROOT GRAFTING.

A number of root grafts were made on *Pyrus baccata* with scions taken from the surviving trees of the old apple orchard. These made good unions, and successfully passed through the winter of 1902-03. They were planted in the *Pyrus* orchard this spring and made good growth during the season.

### TOP GRAFTING.

Scions of the following were received from the Central Experimental Farm and top grafted on *Pyrus baccata* during the past spring:—

Yellow Transparent.
McMahon White.
Hibernal.
Duchess of Oldenburgh,
Malinda.
Wealthy.
Patten's Greening.
Charlamoff.
North-western Greening.

In addition to these a few scions were received from Miss Fowler, of Headingly, Manitoba, of an unnamed red apple. The following named cross-bred apple scions were received from the Central Experimental Farm, Ottawa:—

Charles, Pioneer, Northern Queen,
Carleton, Ruby, Aurora, Derby.

There were no cases of failure to unite, and a good growth was made during the season.

### CROSS-BRED APPLES.

A large number of cross-bred apples fruited for the first time this season, and though none of the named varieties were included, some very fair samples were noted. The most satisfactory of these will be found under the heading of 'Descriptive list of apples.'

A large addition of cross-bred apple seedlings and grafted specimens of the named varieties of cross-breds was made to the *Pyrus* orchards during the past season. Nearly every specimen became established and we have now growing on the farm a large representative collection of this class of apples, which should prove most interesting on coming into bearing.

The following is a descriptive list of the more meritorious varieties of apples fruited this season. All of these make excellent preserves when cooked whole.

*Martha Seedling, No. 1.*—Colour, deep yellow slightly streaked with red; diameter, $1\frac{1}{8}$ inches; flattish; seed cavity medium; ripe middle August; flesh firm, sweet and juicy; calyx persistent.

*Martha Seedling, No. 2.*—Colour, deep yellow slightly streaked with red; diameter, $1\frac{3}{8}$ inches; seed cavity very small; flesh firm, sweet and juicy, with a pleasant aroma; shape, flattish oval; ripe late September; calyx persistent.

*Martha Seedling, No. 3.*—Colour, bright red; diameter, $1\frac{1}{4}$ inches; seed cavity medium; flesh somewhat soft, rather dry but sweet; ripe, early August; calyx persistent.

*Martha Seedling, No. 4.*—Colour, deep yellow; diameter, $1\frac{3}{16}$ inches; seed cavity rather large; flesh soft and mealy; sweet; ripe early in September; calyx persistent.

*Martha Seedling, No. 5.*—Colour, bright yellow, dotted and streaked with red; diameter, $1\frac{2}{16}$ inches; seed cavity, small; flesh firm, sweet and juicy, slightly astringent; shape, flattish; ripe early September; calyx persistent.

*Martha Seedling, No. 6.*—Colour, deep yellow, streaked heavily with red on sunny side; diameter $1\frac{1}{16}$ inches; seed cavity small; flesh firm, sweet and juicy; shape flattish oval; ripe late in August; calyx persistent. The best of the Martha seedlings yet fruited.

*Martha Seedling, No. 7.*—Colour, deep yellow, slightly streaked with red; diameter, $1\frac{3}{16}$ inches; seed cavity large; flesh firm, sweet and juicy, with a pleasant aroma; shape, flattish; ripe late in August; calyx persistent. One of the best flavoured varieties.

*Snyder Seedling, No. 8.*—Colour, deep yellow, slightly streaked with red on sunny side; diameter, $1\frac{3}{16}$ inches; flesh firm, sweet and juicy; seed cavity small; shape roundish; ripe early September; calyx persistent.

*Pyrus baccata* x *Wealthy, No. 9.*—Colour, deep red on sunny side, reverse side light yellow slightly streaked with red; diameter, $1\frac{1}{4}$ inches; seed cavity, medium; ripe second week in September; flesh firm and juicy, slightly astringent; calyx persistent; skin very thin and susceptible to bruising.

*Cross-bred Pyrus Seedling, No. 10.*—Colour very bright red; diameter $1\frac{3}{16}$ inches; shape roundish; seed cavity medium; flesh crisp and juicy and slightly astringent; ripe late August; calyx persistent.

*No. 116, Pyrus baccata x Tetofsky, No. 11.*—Colour bright red; diameter, $1\frac{3}{16}$ inches; seed cavity small; flesh, soft and mealy, sweet; shape flattish; ripe, middle of September; calyx persistent.

*Pyrus baccata* x *Talman's Sweet, No. 12.*—Colour deep yellow, very slightly streaked with red on sunny side; diameter, $1\frac{5}{16}$ inches; seed cavity, medium; flesh, firm and juicy, sub-acid, slightly astringent; shape, flattish round, ripe early in October; calyx persistent.

*Pyrus baccata* x *Talman's Sweet, No. 13.*—Colour, deep red; diameter, $1\frac{5}{16}$ inches; seed cavity small to medium; flesh, firm, sweet and juicy, very slightly astringent; ripe late in August, calyx persistent. A good variety.

*Pyrus baccata* x *Talman's Sweet, No. 14.*—Colour, deep yellow, fairly streaked with red on sunny side; diameter, $1\frac{5}{16}$ inches; seed cavity, medium; flesh firm, sweet, no astringency; ripe early October; calyx persistent. A good sort.

*Pyrus baccata, No. 529, No. 15.*—Colour, bright yellow, streaked with red on sunny side; diameter, $1\frac{3}{16}$ inches; flesh firm, juicy and sweet; seed cavity, medium; ripe, early August; calyx persistent.

*No 125, Parker.*—Colour, deep yellow, heavily splashed with red on sunny side; diameter, $1\frac{7}{16}$ inches; flesh firm, juicy and slightly astringent; seed cavity, medium; ripe middle of September; calyx persistent.

*Transcendent crab.*—The large tree of this variety growing on the hillside again produced a fair crop of excellent fruit. On account of having been used as a source of supply for scions, the crop was not as heavy as it it would otherwise have been.

### PLUMS.

The plum crop of 1903 was the heaviest ever recorded on the Experimental Farm. The fruit set in such profusion that the branches were weighted to the ground, many of them breaking when the fruit attained full size. The trees of the native plum (*Prunus nigra*), ripened practically all their fruit, but those of the American plum (*Prunus Americana*), failed to ripen, authough some large fruit was produced on some specimens of this class.

## SMALL FRUITS.

### RASPBERRIES.

The raspberry crop was only a fair one during the past season, though the crop throughout the province was much above the average. An interesting test was made in order to determine the efficacy of laying down the canes in the fall of the year in order to prevent winter-killing. One-half the row of each variety was laid down, the tips of the canes being held down by a light furrow thrown on them with the plough, the balance being left standing. On the approach of spring the canes were lifted, and while the covered canes were found to be in good condition, those unprotected were dead to snowline. It is evident that, in exposed positions it would be wise to lay down the canes and partly cover them, as described.

### CURRANTS.

The currant crop was an excellent one throughout the province the past season, although, on account of change of location of the currant plantation at the Experimental Farm, the crop was below the average.

## TREES, SHRUBS, HEDGES, &c.

### HEDGES.

No additions were made to the list of trial hedges during the past season, but we would call attention to one or two which have been planted quite recently.

*Cedar or Arbor-Vitæ (Thuya occidentalis),* planted 1900.—Though somewhat slow growing, this is proving quite hardy, and gives promise of making a most symmetrical hedge in the near future, and it bears clipping well.

*Rhamnus cathartica* (Buckthorn).—This plant is receiving considerable attention from the farmers as a hedge plant and seems to promise well for that purpose. The branches are more or less spined, and it should make a good hedge. It is hardy here.

One of the best thorn hedges growing on the farm is that composed of the native Buffalo Berry *(Shepherdia argentea).* Though not a rapid grower, the numerous spines with which it is covered render it a very impervious hedge even when quite small, and its beautiful silvery foliage makes it a striking object during the summer season.

The large hedge of Native Spruce *(Picea alba),* planted in 1893, and now 14 feet high continues to prove very satisfactory and does not show the slightest signs of deterioration on account of crowding, being green from top to base.

The large double-rowed maple hedges *(Acer Negundo),* surrounding the shelter blocks at the south end of the farm, were given a good pruning this season, which greatly added to their appearance.

Several of these sample hedges, which were in a low portion of ground near the superintendent's house, were injured by the heavy floods of a year ago, and it seems doubtful if they will ever thoroughly recover.

### ARBORETUM.

No additions were made to the Arboretum during 1903. The following is a list of varieties planted in 1902, together with notes on their condition this year.

*Crataegus oxyacantha* (English Hawthorn).—Killed to snow-line; strong growth; 1903.

*Ostrya virginica* (Ironwood).—Wintered well; very small growth; 1903.

Banksian Pine *(Pinus banksiana).*—Wintered well; fair growth; 1903.

Red Pine *(Pinus resinosa).*—Wintered well; fair growth; 1903.

### CANKER ON RUSSIAN POPLAR.

This disease continues to make rapid progress on the Experimental Farm, many of the trees of Russian Poplar being more or less seriously affected by it. The canker (a fungus growth), rots the wood tissue, causing the limbs and trunk to break off at the diseased point during high winds. There seems to be no question, but that cuttings made from the affected trees soon exhibit symptoms of the disease, consequently it may be advisable to make a new commencement from seed. This tree is a very rapid grower.

### CRATAEGUS—NIEMETZ (HAWTHORN).

Several of these thorns, procured by Dr. Saunders from Russia from Mr. Niemetz, are growing in the arboretum here, and are well worthy of special notice on account of their comparatively rapid growth, handsome appearance and great hardiness.

Many inquiries are received as to suitable material for thorn hedges, and it seems probable that these would be suitable for this purpose. They are similar in growth to our native thorn *(Crataegus coccinea)* and produce similar offensive spikes, which would render a hedge of this sort almost impenetrable.

### FLOWERING SHRUBS.

Owing to the absence of spring frosts the numerous varieties of flowering shrubs on the farm were much above the average this season, and brought forth enthusiastic comment from visitors, the lilacs, spireas and honeysuckles being especially fine.

### LILAC—CHARLES X.

This is a magnificent form of the common lilac, with very large heads of flowers, which are produced much more abundantly than with the common variety. It has also the advantage of flowering when comparatively young. It may be propagated by grafting on the common stock.

### SEEDLINGS OF LILAC CHARLES X.

The hedge composed of seedlings of Charles X. lilac surrounding one of the Pyrus orchards, flowered heavily for the first time last season, and was very interesting from the fact that they are the first seedlings of this variety yet flowered on the farm. A large percentage of the plants produced flowers quite equal to the parent variety, but the most noticeable peculiarity was the great range of colour, a large number of shades being represented. It is evident that this is a very satisfactory method of propagation.

### EUONYMUS LINEARIS.

This dwarf growing shrub flowered for the first time this year. The flowers are very striking both in colour and form, and the plant blooms when quite young.

### JAPAN LILAC (SYRINGA VILLOSA).

A very distinct form, flowering later than the other varieties, and of a different form and colour. The flower spikes are large, and of a reddish white colour. Its late flowering greatly lengthens the period of lilac blooms..

### PHILADELPHUS GRANDIFLORUS (MOCK ORANGE).

A test was made during the fall of 1902, in order to ascertain the possibility of flowering this beautiful shrub, by means of covering; though the roots are perfectly hardy, the branches are usually killed to snow line, hence the total absence of flowers the following season. The test was partially successful, and a number of flowers were produced during the past summer. A more thorough covering was given before the present winter set in, and we hope thus to still further increase the value of this beautiful flowering shrub.

### SPIRAEAS.

We would call special attention to a few varieties of this hardy flowering class, which is one of the most satisfactory for the North-west.

*Spiraea hypericifolia.*
*Spiraea Van Houttei.*
*Spirae sorbifolia.*

These are arranged in order of earliness, the flowers being produced during a considerable period.

### FALL SOWING OF SEEDS COMPARED WITH STRATIFICATION.

A test was undertaken to find out whether the fall sowing of seeds of flowering shrubs and fruits would be as advantageous, as the means usually adopted, viz., stratification. The latter method is accomplished by filling a box in the fall with alternate layers of the seed and sand, and leaving it in the open where it will be exposed to the full rigour of winter. The boxes are opened, and the seed sown as early as possible in the spring. It is expected that the action of the winter's frost will conduce to quick germination. It will be readily seen that fall sowing would lessen the amount of labour. There is also a drawback to be considered when stratification is resorted to, and that is, that germination sometimes begins in the boxes before spring sowing is possible, and when the box is opened a mass of intergrown, attenuated seedlings are sometimes brought to light. Included in this test were the following varieties:—*Acer ginnala, Acer tatarica, Lonicera tatarica* and *Pyrus baccata.*

The seed germinated readily in the spring, and the seedlings successfully stood a fairly severe frost. From the results of this experiment it would appear that fall sowing may be resorted to with good prospect of success.

### DISTRIBUTION.

A large number of seedlings of flowering shrubs and hedge plants are grown on the farm every year for distribution the following spring. The demand, however, is so great that it is not often that all the applicants can be supplied.

## THE VEGETABLE GARDEN.

### GARDEN PEASE.

Thirty-nine varieties of garden pease were sown in the open ground on May 3, the seed having been grown on the Brandon Experimental Farm in 1902. It was very satisfactory to note that the percentage of germination was in every case excellent, corroborating former experience that Manitoba-grown pease are much above the average.

All varieties again ripened their own seed, and the results of the test follows, arranged in order of earliness.

GARDEN PEASE.

| Varieties. | Length of Pod. | Length of Vine. | Peas in Pod. | Flavour. | Productiveness. |
|---|---|---|---|---|---|
| | In. | In. | | | |
| Steele Briggs' Extra Early | 2 to 2¼ | 16 | 4 to 5 | Fairly sweet.. | Very productive. |
| Tom Thumb | 2¼ " 2½ | 24 | 6 " 7 | " .. | Fairly " |
| Philadelphia Extra Early | 2¼ " 2½ | 36 | 6 " 7 | " .. | " " |
| Bruce's Early Conqueror | 2 " 2¼ | 24 | 4 " 5 | " .. | Not " |
| Alaska | 2¼ " 2½ | 26 | 6 " 7 | " .. | Fairly " |
| Rural New Yorker | 2¾ " 3 | 28 | 5 " 6 | " .. | " " |
| Extra Early Daniel O'Rourke | 2 " 2½ | 30 | 5 " 6 | " .. | Very " |
| Carter's First Crop | 2½ " 3 | 26 | 5 " 6 | " .. | Fairly " |
| McLean's Little Gem | 2 " 2¼ | 18 | 5 " 6 | " .. | " " |
| McLean's Blue Peter | 2½ " 3 | 14 | 5 " 6 | Sweet........ | " " |
| Gregory's Surprise | 2½ " 3 | 36 | 6 " 7 | Fairly sweet.. | " " |
| Extra Early Exonian | 2 " 2¼ | 18 | 4 " 5 | Sweet... .... | Very " |
| Admiral | 2½ " 3 | 36 | 6 " 7 | " ...... ... | " " |
| American Wonder | 2½ " 3 | 14 | 6 " 7 | Very sweet... | " " |
| Surprise | 2 " 2¼ | 26 | 4 " 5 | Sweet......... | Not " |
| Nott's Excelsior | 2½ " 3 | 14 | 6 " 7 | " ......... | Very " |
| Prosperity or Gradus | 3 " 3½ | 30 | 5 " 6 | Very sweet... | Not " |
| William Hurst | 3 " 3½ | 18 | 7 " 8 | " .. | Very " |
| Horsford's Market Garden | 2¾ " 3 | 30 | 6 " 7 | " ... | " " |
| Blue Imperial | 2½ " 3 | 24 | 5 " 6 | Fairly sweet.. | Fairly " |
| Laxton's Supreme | 3¼ " 3½ | 36 | 8 " 9 | Sweet....... . | " " |
| Blue Beauty | 2½ " 3 | 18 | 5 " 6 | Fairly sweet.. | " " |
| Rennie's Queen | 3 " 3¼ | 30 | 8 " 9 | Very sweet... | " " |
| Pride of Market | 2½ " 3 | 30 | 7 " 8 | Fairly sweet.. | " " |
| Rennie's Perfection | 3 " 3¼ | 30 | 6 " 7 | Very sweet... | " " |
| Juno | 3 " 3½ | 30 | 8 " 9 | Excellent..... | Very " |
| Thomas Laxton | 3¼ " 3½ | 30 | 6 " 7 | Very sweet... | Fairly " |
| Fillbasket | 2½ " 3 | 36 | 6 " 7 | " ... | Very " |
| C. P. R. | 3 " 3¼ | 18 | 5 " 6 | " ... | " " |
| Telephone | 3½ " 3¾ | 36 | 7 " 8 | " ... | " " |
| Stratagem | 3¼ " 3½ | 24 | 7 " 9 | " ... | " " |
| Duke of York | 3¼ " 3½ | 36 | 8 " 9 | " ... | " " |
| Duke of Albany | 3 " 3¼ | 36 | 7 " 8 | " ... | Fairly " |
| Champion of England | 3¼ " 3½ | 40 | 8 " 9 | Fairly sweet . | Very " |
| Allen's Dwarf Telephone | 3¼ " 3½ | 20 | 8 " 9 | Very sweet... | Fairly " |
| Yorkshire Hero | 3¼ " 3½ | 28 | 8 " 9 | " ... | " " |
| Shropshire Hero | 3½ " 3¾ | 30 | 8 " 9 | " ... | " " |
| Early Dwarf Brittany | Edible podded varieties. | | | " ... | Very " |
| Tall Scimitar | " " | | | " ... | " " |

## ONIONS.

Seven varieties of onions were sown on April 14 in rows 12 inches apart, with Planet Junior hand drill. The germination was excellent in all cases, and the product above the average both in yield and quality. The yield of the Red Prize Taker, a variety tested here for the first time this season, has been large, and this may be a valuable onion for this province. Following will be found the result of this test, arranged in order of productiveness:—

ONIONS.

| Varieties. | Sown. | Pulled. | Colour. | Shape. | Yield per Acre. | |
|---|---|---|---|---|---|---|
| | | | | | Bush. | Lbs. |
| Prize Taker (Red) | May 14 | Sept. 8 | Deep red | Globular | 871 | 12 |
| Red Wethersfield | " 14 | " 8 | " | Flattish | 671 | 13 |
| Trebon's Yellow | " 14 | " 8 | Light yellow | Globular | 544 | 30 |
| Yellow Globe, Danvers | " 14 | " 8 | Dark " | " | 508 | 17 |
| Gibraltar | " 14 | " 8 | Light " | " | 471 | 54 |
| Paris's Silverskin Market | " 14 | " 8 | White | Flattish | 435 | 36 |
| Favourite Keeping | " 14 | " 8 | Light yellow | Globular | 381 | 9 |

## SQUASH AND PUMPKINS.

Forty-six varieties of squash and pumpkins were sown in the open on May 28, in hills ten feet apart each way. The coolness of the summer prevented the best results being obtained, although a very fair yield was had, many of the varieties coming quite up to the average.

We would again point out the special value of the Bush forms of squash as compared with the running varieties, on account of their earliness and ease of cultivation. Extra Early Orange Marrow continues to merit our good opinion, as to its being the best substitute for a pie pumpkin yet tested here.

The following results were obtained:—

SQUASH AND PUMPKINS.

| Varieties. | Sown. | Ripe and Ready. | Colour of Skin. | Colour of Flesh. | Form. | Weight. | Quality. |
|---|---|---|---|---|---|---|---|
| | | | | | | Lbs | |
| Grey Mammoth | May 28 | Sept. 20 | Green'h white | Light yellow | R | 30 | Rough for feed. |
| Jumbo | " 28 | " 20 | Bright yellow | " | R | 25 | " |
| Golden Oblong | " 28 | | | | R | .... | Did not mature fruit. |
| Japanese Pie | " 28 | Sept. 15 | Dark yellow | Light yellow | R | 10 | Fine for pies. |
| Cushaw | " 28 | | | | R | .... | Did not produce fruit |
| Sweet or Sugar | " 28 | Sept. 15 | Dark yellow | Light yellow | R | 8 | Fine for pies. |
| Mammoth Tours | " 28 | " 20 | Green'h white | Green'h yellow | R | 20 | Rough for feed. |
| Jonathan | " 28 | " 20 | Bright yellow | Light yellow | R | 25 | " |
| Red Etampes | " 28 | | | | R | .... | Did not mature fruit. |
| Large Field | " 28 | Sept. 10 | Deep yellow | Light yellow | R | 32 | Rough for feed. |
| Nantucket or Negro | " 28 | " 15 | Deep green | " | R | 15 | " |
| Winter Luxury | " 28 | " 20 | Light yellow | " | R | 10 | Fine for pies. |
| Mammoth King | " 28 | " 20 | Deep yellow | Med. yellow | R | 35 | Rough for feed. |
| Japan Crookneck | " 28 | | | | R | .... | Did not produce fruit |
| Mammoth Globe | " 28 | Sept. 20 | Deep green | Light yellow | R | 33 | Rough for feed. |
| Golden Bronze | " 28 | | | | R | .... | Did not mature fruit. |
| Turban | " 28 | Sept. 20 | Orange | Light yellow | R | 6 | Fair quality. |
| Chicago Warted Hubbard | " 28 | | | | R | .... | Did not mature fruit. |
| Perfect Gem | " 28 | | | | R | .... | " " |

SQUASH AND PUMPKINS—*Concluded.*

| Varieties. | Sown. | Ripe and Ready. | Colour of Skin. | Colour of Flesh. | Form. | Weight. | Quality. |
|---|---|---|---|---|---|---|---|
| | | | | | | Lbs | |
| Pike's Peak or Silby | " 28 | Sept. 25 | Green'h white. | Green'h yellow | R | 10 | Good quality. |
| Mammoth Whale | " 28 | " 15 | Deep green.... | Light yellow.. | R | 38 | Rough for feed. |
| Winter Crookneck | " 28 | ........ | ........ | ........ | R | .... | Fruit did not ripen. |
| Summer Crookneck | " 28 | Aug. 20 | Orange. | Deep yellow.. | R | 7 | Valueless. |
| Canada Crookneck | " 28 | " 20 | " | " | R | 7 | " |
| Boston | " 28 | ........ | ........ | ........ | R | ... | Did not produce fruit |
| Cocoanut | " 28 | ........ | ........ | ........ | R | .... | " " |
| Golden Hubbard | " 28 | Sept. 10 | Deep yellow. | Light yellow.. | B | 11 | Good. |
| Italian Marrow | " 28 | " 10 | Light yellow. | Cream yellow. | B | 9 | Excellent. |
| Faxon | " 28 | ........ | ........ | ........ | R | ... | Did not produce fruit |
| Long White Bush Marrow | " 28 | Aug. 12 | Yellow'h white | Yellow'h white | B | 12 | Excellent. |
| Der Wing | " 28 | ........ | ........ | ........ | R | .. | Did not produce fruit |
| Long Isd. Bush Scalloped. | " 28 | Sept. 1 | White | Yellow'h white | B | 3 | Fair. |
| Fordhook | " 28 | ........ | ........ | ........ | R | .... | Did not mature fruit. |
| Early Golden | " 28 | Aug. 25 | Deep yellow.. | Light yellow.. | B | 5 | Valueless. |
| Warren | " 28 | ........ | ........ | ........ | R | .... | Did not mature fruit. |
| English Vegetable Marrow | " 28 | Aug. 25 | Yellow'h white | Yellow'h white | R | 7 | Excellent. |
| Cocozelle Bush | " 28 | " 15 | Green'h white. | " " | B | 12 | " |
| Silver Custard | " 28 | Sept. 5 | White | Whitish | B | 4 | Fair. |
| White Bush Scalloped | " 28 | " 5 | " | " | B | 4 | " |
| Marble Head | " 28 | ........ | ........ | ........ | R | .... | Did not produce fruit |
| Delicata | " 28 | ........ | ........ | ........ | R | .... | " " |
| Ex. Early Orange Marrow | " 28 | Sept. 1 | Deep orange.. | Light yellow.. | R | 10 | Fine for pies. |
| Golden Custard Bush | " 28 | Aug. 25 | " yellow.. | " | B | 5 | Valueless. |
| Pine Apple | " 28 | ........ | ........ | ........ | R | .... | Did not mature fruit. |
| Delicious | " 28 | ........ | ........ | ........ | R | .... | " " |
| Bay State | " 28 | ........ | ........ | ........ | R | .... | " " |

BEANS.

Seven varieties of beans were sown in the open on May 29, in rows 30 inches apart; and with one exception a most satisfactory crop was obtained. The exception was the variety, Henderson's Dwarf Bush Lima, the earliest bean of this type which is listed by American seedsmen, but it failed to arrive at a fit condition for table. The results of this test are given below, the varieties being arranged in order of earliness.

| Varieties. | Sown. | Colour Pod. | Length of Pod. | Texture and Flavour. | Ripened |
|---|---|---|---|---|---|
| Dwarf Golden Skinless | May 29 | Light yellow | 5 inches | Fairly tender good | None. |
| Dwarf French matchless | " 29 | " | 5 " | Very tender good | " |
| Bagnolet | " 29 | Green | 6 " | " " | " |
| Dwarf Inexhaustible | " 29 | " | 6 " | Tender good | " |
| Fame of Vitry | " 29 | " | 6½ " | Fairly tender good | " |
| Emperor of Russia | " 29 | " | 6½ " | Tender | " |
| Henderson's Bush Lima | " 29 | Did not reach condition for table. | | | |

CABBAGE.

Eight varieties of cabbage were sown in cold frames on April 20, and transplanted to the open on May 23. All varieties did well, but special attention is called to the Savoy cabbage (Green Globe). This is a late variety which has proven to be excellent for winter storage, far better than the others in this respect.

The following results were obtained:—

| Variety. | Sown. | Transplanted. | Early or Late. | Texture. | Average weight. |
|---|---|---|---|---|---|
| | | | | | Lbs. |
| Paris Market, very early | April 20 | May 23 | Very early | Fairly firm | 8 |
| Early Express | " 20 | " 23 | Early | Somewhat loose | 7 |
| Early Jersey Wakefield | " 20 | " 23 | " | Firm | 8 |
| Early Winningstadt | " 20 | " 23 | Summer | Very firm | 9 |
| Midsummer Savoy | " 20 | " 23 | " | Loose | 5-6 |
| Fottler's Drumhead | " 20 | " 23 | Late | Very firm | 13 |
| Green Globe Savoy | " 20 | " 23 | " | Fairly firm | 8 |
| Red Drumhead | " 20 | " 23 | " | Very firm | 9 |

### PARSNIPS.

Three varieties of parsnips were sown on April 14, in rows 30 inches apart, with a Planet Junior hand drill. Hollow Crown gave the heaviest yield, and ranked first in regard to quality. The Student is a turnip-shaped variety of fair quality, and very easy to harvest, this with the long varieties being a somewhat difficult operation.

The following results were had :

| Varieties. | Sown. | Lifted. | Shape. | Flavour. | Yield per Acre. | |
|---|---|---|---|---|---|---|
| | | | | | Bush. | Lbs. |
| Hollow Crown | April 14 | October 5 | Long | Good | 667 | 55 |
| Half Long | " 14 | " 5 | Half-long | Fair | 435 | 36 |
| Student | " 14 | " 5 | Short | " | 412 | 9 |

### TOMATOES.

Two varieties of tomatoes were sown in the hotbed on April 20, and transplanted to the open on May 27. The most noticeable point in connection with this test was the early planting out (May 27).

The plants escaped frost, and a larger quantity of ripe fruit was harvested than usual.

| Varieties. | Sown. | Transplanted. | Ripe. | Colour. | Shape. | Flavour. |
|---|---|---|---|---|---|---|
| Century | April 20 | May 27 | August 25 | Bright red | Smooth | Meaty, very juicy. |
| Earliana | " 20 | " 27 | " 10 | " | Ribbed | Fair. |

Representatives of all standard varieties of vegetables not referred to in the foregoing, were tested during the past season, including radish, citron, &c., with uniformly good results. The twenty varieties of rhubarb under trial gave heavy returns. A quantity of rhubarb seed of the best varieties was gathered for distribution.

## LIST OF VARIETIES OF VEGETABLES ESPECIALLY SUITABLE FOR MANITOBA.

Many inquiries are made of the officers of the Experimental Farm regarding the most profitable varieties of vegetables to grow in this province. Following will be found a list of selected varieties compiled from the results of several years' trial on this farm:—

*Asparagus.*—Conover's Colossal, Columbia, Mammoth White.

*Beans (Dwarf).*—Canadian Wonder (yellow podded), Scarlet Flageolet Wax (yellow podded), Stringless Green Podded (green podded).

*Beans, Broad.*—Broad Windsor.

*Beets.*—Early Blood Turnip (early), Long Smooth Deep Blood Red (for winter storage).

*Cabbage.*—Paris Market Very Early (early), Early Jersey Wakefield (early), the Lupton (late), Marblehead Mammoth (late), Large Red Drumhead (late), Drumhead Vertus (Savoy).

*Carrots.*—Early Scarlet Horn (early), Half-long Danvers (late).

*Celery.*—White Plume (early), Giant Pascal (early), London Red (early).

*Cauliflower.*—Early Snowball (early and medium), Extra Early Paris (early and medium).

*Cress or Pepper-grass.*—Extra curled.

*Cucumbers.*—Early Cluster, Cumberland, White Wonder

*Corn, Sweet.*—Early Cory.

*Corn, Flint.*—Mitchell's Extra Early.

*Lettuce.*—Neapolitan (cabbage), White Paris Cos (cos).

*Kohl Rabi.*—Early White Vienna.

*Musk Melon.*—Extra Early Green.

*Citron.*—Colorado Mammoth.

*Parsnip.*—Hollow Crown (long), Student (short).

*Onion Sets.*—Yellow Dutch, English Multipliers, Shallots.

*Onion (Seed).*—Yellow Globe Danvers (large), Red Prize Taker (large), Gibraltar (large), Adriatic White Barletta (pickling).

*Peas.*—Extra Early Exonian (1st early), William Hurst (2nd early), American Wonder (2nd early), Juno (late), Shropshire Hero (late).

*Parsley.*—Moss Curled.

*Radish.*—Early Scarlet Turnip, French Breakfast.

*Spinach.*—Victoria.

*Squash.*—Extra Early Orange Marrow, English Vegetable Marrow, Long White Bush Marrow.

*Salsify.*—Sandwich Island.

*Tomatoes.*—Earliana, Earliest of All, Early Ruby.

*Turnip (Garden).*—Early Snowball, Robertson's Golden Ball.

*Herbs.*—Sage, Savory, Thyme, Parsley.

### SAVORY AND MEDICINAL HERBS.

Twenty-three varieties of herbs were sown in the open on May 28. Owing to the somewhat cool summer and late date of sowing, few of them arrived at maturity, and several failed to germinate. Among those which succeeded best were, Tansy, Lemon Thyme, Coriander, Rosemary, Borage, Rue, Sweet Basil, Winter Savory, Dill and Anise Seed.

### PEANUTS.

A small quantity of peanuts, catalogued as a very early variety, was purchased from a Canadian seedsman and sown in the open on May 28.

They germinated promptly, but although they made excellent growth, they failed to produce the slightest signs of tubers.

### FLOWERS.

The usual representative collection of annuals was again sown on the Farm during the past season, with excellent results. Owing to the very bright weather experienced during the early spring, large healthy plants were available at planting out time, and as there were no late frosts the annuals came quickly into flower, presenting a mass of colour throughout the season. Petunias (single and double), Phlox, Verbenas and Stocks were especially fine, and called forth much favourable comment. In consequence of the disastrous results to the garden experienced last season by reason of the accumulation of water in the valley, the beds were raised from 12 to 18 inches, which proved to be very satisfactory, and it is hoped that the results will be permanent.

### HARDY ROSES.

Two varieties of hardy roses at present growing on the farm continue to prove hardy, and gave an exceptionally heavy crop of flowers during the summer. It is unfortunate that both these varieties were received from individuals who had lost their names, as they are likely to be of special value to Manitoba and the North-west, on account of their hardiness. The colour of one is a light pink, that of the other a deep red, and both are double. Propagation is readily effected by means of suckers which are produced abundantly by both these varieties.

### LILIES.

The following varieties of lilies planted in 1902 have proved thoroughly hardy without the slightest protection:—

Lilium Dahuricum Gretchen.
" " atrosanguineum.
" " incomparabile.
" " Brittanicum.
" " grandiflorum.
" Hansoni.
" tigrinum, fl; pl.
" Tottenhami.
" Sensation.
" elegans Van Houttei.
" " aureum.

These are very free flowering varieties, with large individual flowers of bright colouring. They come into bloom early in the season and remain in flower for a considerable period.

### TULIPS AND OTHER SPRING FLOWERING BULBS.

Tulips made an exceptionally fine display during the past season, and the large collection of named varieties was much appreciated by all lovers of flowers. This is no doubt the most satisfactory spring flowering bulb for the North-west, and by a judicious selection of varieties, the blooming period can be prolonged for a considerable time. Tulips are quite hardy here without protection.

### SNOWDROPS.

Bulbs of this beautiful harbinger of spring, planted on the farm in the fall of 1902, have now successfully passed through two winters. It is gratifying to know that this old-fashioned flower can be satisfactorily grown in Manitoba.

### SCILLA SIBIRICA ALBA.

This is similar to the well known blue Squill, with the exception of colour, which is a pure white, and as an edging for a bed, alternated with the blue variety, it is very useful, and is perfectly hardy without protection.

### COLCHIUM AUTUMNALE (FALL CROCUS).

This bulbous flower deserves special mention on account of its being the last plant of the season to come into bloom. After the ground is covered with snow the flower will push itself through, resembling (at a casual glance) our spring Anemone, and being thoroughly hardy, is a welcome addition to our list of bulbous perennials.

### PUSCHKINIA SCILLOIDES.

Special attention is called to this beautiful spring flowering bulb, which has now come through two winters at the Experimental Farm in good condition without protection. As its name implies, it is squill-like in appearance, but differs in having a distinct white band down the centre of each petal, rendering it very attractive.

### CROCUS.

These bulbs, planted in the fall of 1902, have now passed successfully through two winters, and it appears that they may be considered as hardy in the North-west. They make a decided acquisition to our list of spring flowering bulbs.

### FRITILLARIAS.

Of a large number of these bulbs planted in 1901, two came through the winter of 1901-02, but did not flower. The same bulbs also wintered successfully in 1902-03, but again failed to produce flowers.

### HERBACEOUS PERENNIALS.

None of the varieties under test succumbed during the past winter, and a very creditable show of flowers was made during the summer, the large number of varieties of Iris and Peonies being especially fine. This branch of floriculture is becoming more popular with farmers each year.

### PROPAGATION OF TREES FOR THE FORESTRY BRANCH OF THE DEPARTMENT OF THE INTERIOR.

All the 876,000 trees grown here in 1902 for the above department were distributed this spring to farmers in different parts of the province, and the percentage of loss, I understand, was very small.

About one million and a half trees were grown here this year for future distribution by the Forestry Branch, nearly all the young trees were dug in the fall and healed in ready for spring shipping.

## DISTRIBUTION OF GRAIN, POTATOES, &c.

The usual distribution was made of grain, potatoes, maple seed, rhubarb seed and flower seeds. The following quantities were sent out to applicants:—

| | |
|---|---|
| Grain of all kinds in 3-pound bags | 161 |
| Seedling trees and shrubs, packages | 555 |
| Potatoes in 3-pound bags | 241 |
| Maple seed in ½-pound bags | 137 |
| Rhubarb seed, packages | 64 |
| Flower seeds, packages | 117 |

The following reports have been received from parties to whom Manitoba maple seeds were sent in 1-pound packages during the spring of 1902:—

| | |
|---|---|
| Number of applicants supplied | 216 |
| Number of reports received | 74 |

| | Successes. | Failures. |
|---|---|---|
| Seeds sown on summer-fallow | 21 | 4 |
| " " spring ploughing | 9 | 4 |
| " " backsetting | 10 | 5 |
| " " garden (dug with spade) | 10 | 2 |

Maximum number of trees grown from one packet.. .. .. .. 2,500

## INJURIOUS INSECTS.

Red Spider *(Tetranychus telarius)* was very numerous and destructive on the native White Spruce during the early summer; many of the lower branches were discoloured, and in some instances the needles were stripped from them.

Green Lice *(Aphis)* were also plentiful on the native Ash-leaved Maple for a short time, but these disappeared during the heavy rains of August.

The Western Blister-Beetle *(Cantharis Nutalli)* was very numerous on English Horse Beans, and a few were also found on potatoes. In a very few days they stripped the leaves from the plants, but quickly succumbed to a spraying of Paris Green and water; a teaspoonful of the poison to a pail of water.

## NEW BRIDGE.

During the year a new traffic bridge has been built across Lake Percy, replacing the unsafe pontoon foot bridge in use for many years, and making the southern portion of the farm easy of access.

## SAMPLES FOR EXHIBITION PURPOSES.

Twenty large cases of exhibits have been prepared and forwarded to Ottawa for the exhibition to be held at St. Louis next year. These contain grain in the straw, grasses and preserved fruits and vegetables; a portion of this exhibit was grown on the Experimental Farm and the balance collected from farmers throughout the province. In every instance the name of the grower is attached to the exhibit. In addition to the above, a large collection of threshed grain has been prepared for the same purpose.

The usual exhibits were made at the Brandon Agricultural and Horticultural Shows, and a display was also made at the Western Horticultural Exhibition at Winnipeg.

The Department of the Interior was supplied with a quantity of millets and grain for the use of their immigration offices in both Europe and the United States.

## FARMERS' MEETINGS.

During the year meetings were attended and addresses given at the following places:—

Winnipeg, December 30, 1902.
Oak Lake, January 2, 1903.
Winnipeg, February 19, 1903.
Winnipeg, February 26, 1903.
Deloraine, March 17, 1903.
Boissevain, March 19, 1903.
Killarney, March 19, 1903.
Cartwright, March 20, 1903.
Crystal City, March 20, 1903.
Manitou, March 21, 1903.

## VISITORS.

The number of visitors to the Experimental Farm during the past year has exceeded all previous records, approximating 12,000. In addition to the large number of delegates from the United States, the farm was honoured with a visit from the 200 British delegates attending the fifth Congress of the Chambers of Commerce, held at Montreal. They spent some time on the farm, and appeared much interested in the experiments in progress.

Representatives of some of the largest British flour mills were particularly interested in the production of No. 1 wheat, which they spoke very highly of. A field of Banner oats just harvested attracted the attention of the oatmeal millers in the party.

The usual provincial ploughing match and picnic was held on the farm, and the attendance was above the average.

### METEOROLOGICAL TABLES.

| Months. | Highest temperature. | | Lowest temperature. | | Total rainfall. | Total snowfall. | Total amount of sunshine. |
|---|---|---|---|---|---|---|---|
| 1902. | Day. | Deg. | Day. | Deg. | Inches. | Inches. | Hours. |
| December | 31 | 32 | 25 | —40 | ........ | 13 | 84·3 |
| 1903. | | | | | | | |
| January | 25 | 38 | 30 | —35 | ........ | 19 | 87·8 |
| February | 15 | 30 | 16 | —44 | ........ | 6 | 157·8 |
| March | 31 | 47 | 20 | —21 | ........ | 1 | 151·9 |
| April | 18 | 80 | 29 | 10 | ·41 | 2 | 190·1 |
| May | 14 | 88 | 2 | 18 | 4·29 | ........ | 195·4 |
| June | 26 | 87 | 22 | 35 | ·67 | ........ | 237·9 |
| July | 23 | 94 | 13 | 39 | 2·13 | ........ | 258·4 |
| August | 20 | 89 | 29 | 38 | 3·93 | ........ | 178·5 |
| September | 28 | 73 | 14 | 22 | 1·97 | 12 | 140·3 |
| October | 24 | 70 | 17 | 14 | ·89 | ........ | 181·8 |
| November | 2 | 67 | 24 | —18 | ........ | ........ | 112·8 |
| | | | | | 14·29 | 53 | 1977·0 |

## CORRESPONDENCE.

This year 3,767 letters were received and 2,848 despatched, irrespective of circulars sent out.

I have the honour to be, sir,
Your obedient servant,

S. A. BEDFORD,
*Superintendent.*

# EXPERIMENTAL FARM FOR THE NORTH-WEST TERRITORIES.

## REPORT OF ANGUS MACKAY. SUPERINTENDENT.

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.,
November 30, 1903.

DR. WM. SAUNDERS,
Director, Experimental Farms,
Ottawa.

SIR,—I have the honour to submit to you the sixteenth annual report of the operations of the Experimental Farm for the North-west Territories at Indian Head, Assiniboia, during the year 1903.

Like all its predecessors, the past season has had its drawbacks, and though the crops throughout the Territories have not realized what they promised at one time, many districts have given good returns, though a good deal of the grain is inferior.

With the exception of one or two seasons, the soil was never so dry as in the fall of last year, in the wheat-growing districts of Assiniboia, and this spring being without rain till May 17, the grain, though sown early, was in many cases very late in germinating, and August being cold and wet, all the late germinating crops were slow in maturing, and were caught by frost on morning of September 5, and injured according to the stage of ripeness they were in. In most cases the injured grain was on fallowed land, especially where fallows were ploughed deep, just before or after harvest last fall, causing the soil to dry out,, leaving it loose and subject to the dry winds of winter and early spring. Crops on breaking and backsetting were in some cases injured also from the same cause as operated against the crops on fallowed land. Grain on stubble land invariably ripened before frost visited the country, and as a rule gave satisfactory returns.

Harvest started from August 20 to 25, but was often delayed by heavy rain storms, which were more or less prevalent during all of September. October was fine, and permitted threshing to be carried on with few interruptions, and in many districts it was completed in that month.

Stock throughout the territories did well the past season, though at present prices do not rule as high as last year.

### EXPERIMENTAL FARM CROPS.

The crops on the Experimental Farm were, with a few exceptions, extra good. In grain the yields were large, especially in oats and barley. The wheat yields also were satisfactory, but the late varieties were injured by the frost and rust.

Corn, potatoes and roots, with carrots excepted, gave large returns.

The hay crop, on account of the dry spring, was not heavy.

In cultivated fruits, raspberries and crab apples gave good crops. Currants, gooseberries and plums were failures. Native fruits were completely destroyed by May frosts.

I wish to draw the attention of territorial wheat growers to the varieties of wheat, Preston, Stanley and Huron, which have been tested for some years on the Experimental Farm. These varieties were sown later than Red Fife, and were ripe, cut and in stook five or six days before frost came, while Red Fife was injured by the cold wave that passed over on the morning of September 5. The two varieties, Preston and Stanley, are cross bred wheats, originated by Dr. Saunders, Director of Experimental Farms, Preston being bearded and Stanley bald. The parents of both varieties were Red Fife and Ladoga. The leading milling authorities in Great Britain and the United States, after thorough tests, pronounce both wheats about equal to Red Fife in milling qualities.

Huron, a bearded sort, is also a cross-bred, originated by Dr. A. P. Saunders, Ladoga and White Fife being the parents. It has always been near the top in yield, and this year heads the list in productiveness. It also matured before the frost came. Preston, Stanley and Huron were the only sorts, out of nine varieties sown, that will grade N. 1 Hard, Monarch and Percy, though fairly ripe, had heads not matured, which the frost injured.

## EXPERIMENTS WITH WHEAT.

Sixty-two varieties of wheat were tested on 1-20 or 1-40 acre plots. These were sown by hoe drill on April 18 on fallowed land, 1½ bushels seed was sown per acre, the soil being a clay loam. As will be seen, many of the sorts were too late in maturing. In comparing Preston, Stanley and Huron in this list, and in the field lots, it will be seen that they correspond fairly well in yield and ripening. A number of the varieties were struck by rust, causing sample to be very poor.

SPRING WHEAT—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | Lbs. | Bush. | Lbs. | | |
| 1 | Mahmoudi .......... | Sept. 8 | 143 | 45 | Strong.. | 3½ | Bearded | 4,080 | 46 | .. | 60½ | |
| 2 | Weldon.............. | " 8 | 143 | 50 | " . | 4½ | Bald ... | 3,260 | 43 | 40 | 60 | Slightly. |
| 3 | Preston ............ | " 1 | 136 | 50 | " . | 3½ | Bearded | 4,250 | 43 | 10 | 60½ | " |
| 4 | Kahla............... | " 8 | 143 | 46 | " . | 2 | " | 2,880 | 42 | 40 | 61 | |
| 5 | Hungarian .......... | " 2 | 137 | 50 | " . | 3 | " | 3,240 | 42 | .. | 59 | Considerably. |
| 6 | Pringle's Champlain. | " 4 | 139 | 49 | " . | 4 | " | 4,100 | 41 | 40 | 63 | Very slightly. |
| 7 | Roumanian .......... | " 8 | 143 | 50 | " . | 3 | " | 3,940 | 41 | .. | 61½ | |
| 8 | Fraser ... . ........ | Aug. 26 | 130 | 47 | " . | 3¼ | " | 5,005 | 39 | 35 | 62½ | Slightly. |
| 9 | Stanley ............ | Sept. 1 | 136 | 50 | " . | 4 | Bald ... | 4,370 | 39 | 10 | 59 | Very slightly. |
| 10 | Huron ..... ........ | " 1 | 136 | 50 | " . | 3¼ | Bearded | 4,700 | 39 | .. | 60 | Slightly. |
| 11 | Adjini ............. | " 8 | 143 | 42 | " . | 2 | " | 2,860 | 39 | .. | 61 | |
| 12 | Angus ........ .... | " 1 | 136 | 47 | " . | 3¼ | Bald ... | 4,870 | 38 | 50 | 60 | Slightly. |
| 13 | Norval.............. | Aug. 29 | 133 | 49 | " . | 4 | Bearded | 5,375 | 38 | 45 | 61½ | " |
| 14 | Red Fife............ | Sept. 7 | 142 | 50 | " . | 3½ | Bald ... | 4,090 | 38 | 30 | 57½ | " |
| 15 | Hastings........ .... | " 7 | 142 | 48 | " . | 3¼ | " ... | 4,900 | 38 | 20 | 60 | Considerably. |
| 16 | Advance .......... . | " 7 | 142 | 48 | " . | 3½ | " ... | 5,920 | 38 | .. | 58 | Slightly. |
| 17 | Alpha. .... ....... | " 1 | 136 | 48 | " . | 3½ | Bearded | 3,060 | 37 | 40 | 57 | " |
| 18 | Australian No. 27.... | * .... | * .. | 51 | " . | 4¼ | Bald ... | 5,585 | 37 | 35 | 56 | " |
| 19 | Crawford........... | Aug. 29 | 133 | 45 | " . | 3 | " ... | 3,685 | 37 | 15 | 61 | " |
| 20 | Crown........ . ... | Sept. 4 | 139 | 49 | " . | 3½ | " ... | 6,320 | 37 | .. | 57½ | " |
| 21 | Benton ............. | " 3 | 138 | 48 | " . | 3 | " ... | 5,610 | 36 | 30 | 62 | " |
| 22 | Percy ... .......... | " 1 | 136 | 53 | " . | 4 | " ... | 3,570 | 36 | 30 | 56 | " |
| 23 | Laurel.............. | * .... | * .. | 46 | Medium | 4 | " ... | 5,560 | 36 | 20 | 54 | |
| 24 | Chester ......... . | Sept. 1 | 138 | 46 | Strong.. | 3½ | " ... | 5,025 | 36 | 15 | 61 | |
| 25 | Goose............... | " 6 | 141 | 46 | " . | 2½ | Bearded | 2,630 | 36 | 10 | 61½ | |
| 26 | White Fife.......... | " 6 | 141 | 48 | " . | 3¼ | Bald ... | 4,435 | 36 | 5 | 59 | |
| 27 | Clyde. .... ........ | Aug. 29 | 133 | 50 | " . | 3½ | " ... | 4,840 | 36 | .. | 60½ | |
| 28 | Countess.. ......... | " 29 | 133 | 46 | " . | 2¾ | " ... | 5,590 | 35 | 50 | 60½ | " |
| 29 | Colorado............ | Sept. 3 | 138 | 46 | " . | 3 | Bearded | 4,075 | 35 | 25 | 61 | |
| 30 | Byron .............. | Aug. 29 | 133 | 44 | " . | 3 | " | 3,880 | 35 | 20 | 62 | " |
| 31 | Herisson Bearded.... | * .... | * .. | 46 | Medium | 2 | " | 6,400 | 35 | 20 | 58½ | |
| 32 | Early Riga. .. .. . | Aug. 25 | 129 | 45 | Strong.. | 2¾ | Bald ... | 4,110 | 35 | 10 | 60¼ | Considerably. |
| 33 | White Connell....... | Sept. 6 | 141 | 49 | " . | 3½ | " ... | 4,700 | 35 | .. | 57½ | |
| 34 | Monarch... ......... | " 4 | 139 | 47 | " . | 3 | " ... | 4,060 | 35 | .. | 57 | Slightly. |
| 35 | Plumper ........... | " 1 | 136 | 45 | " . | 3¼ | Bearded | 4,710 | 34 | 50 | 61 | " |
| 36 | Girgeh.............. | Aug. 25 | 129 | 30 | " . | 2¼ | " | 4,310 | 34 | 50 | 51 | " |

SPRING WHEAT—TEST OF VARIETIES—*Concluded.*

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | Lbs. | Bush. | Lbs. | | |
| 37 | Progress .......... | Sept. 1 | 136 | 46 | Strong.. | 3 | Bald ... | 4,910 | 34 | 30 | 58 | Considerably. |
| 38 | Red Fern. .. ....... | " 7 | 142 | 49 | " . | $4\frac{1}{4}$ | Bearded | 5,710 | 34 | 10 | 57 | Slightly. |
| 39 | Blair .... ......... | Aug. 29 | 133 | 43 | " . | $2\frac{3}{4}$ | Bald ... | 3,090 | 33 | 50 | 62 | Considerably. |
| 40 | Australian No. 19.... | * ... | * .. | 51 | " . | $3\frac{1}{4}$ | " ... | 5,215 | 33 | 45 | $53\frac{1}{2}$ | Slightly. |
| 41 | Dawn.............. | Aug. 28 | 132 | 43 | " . | 3 | " ... | 5,480 | 33 | 40 | $59\frac{1}{2}$ | " |
| 42 | Cartier.... ... .. . | " 29 | 133 | 45 | " . | $2\frac{3}{4}$ | Bearded | 2,950 | 33 | 30 | $62\frac{1}{2}$ | " |
| 43 | Wellman's Fife ..... | Sept. 7 | 142 | 51 | " . | $4\frac{1}{2}$ | Bald ... | 2,650 | 33 | 10 | $57\frac{1}{2}$ | " |
| 44 | Admiral....... .... | " 1 | 136 | 49 | " . | $3\frac{1}{2}$ | Bearded | 3,250 | 32 | 30 | 61 | |
| 45 | Minnesota No. 149 .. | * .... | * .. | 48 | " . | $3\frac{1}{2}$ | Bald ... | 5,490 | 32 | 20 | 58 | |
| 46 | Essex. ..... ....... | * .... | * .. | 50 | " . | 4 | " ... | 5,300 | 32 | 20 | 55 | Considerably. |
| 47 | Australian No. 9.. .. | * .... | * .. | 51 | " . | 4 | " ... | 3,880 | 32 | .. | 57 | |
| 48 | White Russian ... . | * ... | * .. | 48 | " . | $3\frac{1}{2}$ | " ... | 4,890 | 31 | 50 | 55 | Slightly. |
| 49 | Rio Grande ......... | Sept. 7 | 142 | 51 | " . | $4\frac{1}{2}$ | Bearded | 3,630 | 31 | 30 | $56\frac{1}{4}$ | |
| 50 | Australian No. 25.... | * .... | * .. | 48 | " . | 4 | Bald ... | 5,745 | 31 | 15 | 54 | " |
| 51 | Cassel... ........... | Sept. 1 | 136 | 52 | " . | $3\frac{3}{4}$ | " ... | 4,645 | 30 | 55 | 61 | |
| 52 | Robin's Rust-proof... | " 1 | 136 | 47 | " . | $3\frac{1}{2}$ | Bald ... | 3,550 | 30 | 50 | $62\frac{1}{2}$ | " |
| 53 | Minnesota No. 181... | * .... | * .. | 49 | " . | $3\frac{1}{2}$ | " ... | 5,835 | 30 | 25 | 57 | " |
| 54 | Red Swedish....... | * .... | * .. | 49 | Weak .. | 4 | Bearded | 5,520 | 29 | 20 | 58 | |
| 55 | Bishop.... . ...... | Sept. 1 | 136 | 46 | Strong.. | $3\frac{1}{4}$ | Bald ... | 4,065 | 28 | 15 | $61\frac{1}{2}$ | " |
| 56 | Japanese........... | Aug. 26 | 130 | 42 | " . | $2\frac{3}{4}$ | Bearded | 4,840 | 27 | 40 | 57 | " |
| 57 | Minnesota No. 163... | * .... | * .. | 51 | " . | $3\frac{1}{2}$ | Bald ... | 7,880 | 27 | .. | $54\frac{1}{2}$ | " |
| 58 | Australian No. 23.... | * .... | * .. | 52 | " . | $3\frac{1}{2}$ | " ... | 5,385 | 26 | 55 | 53 | " |
| 59 | Australian No. 10.... | * .... | * .. | 48 | " . | $3\frac{1}{2}$ | " ... | 5,295 | 26 | 45 | 55 | " |
| 60 | Vernon...... ...... | Sept. 1 | 136 | 45 | " . | 3 | Bearded | 6,270 | 25 | 30 | 57 | Considerably. |
| 61 | Australian No. 13.... | * .... | * .. | 50 | " . | $3\frac{3}{4}$ | Bald ... | 5,005 | 22 | 35 | 52 | Slightly. |
| 62 | Minnesota No. 169... | * .... | * .. | 54 | " . | $4\frac{3}{4}$ | " ... | 5,205 | 21 | 35 | 49 | " |

*These varieties were not fully ripe, but were cut on Sept. 8 on account of frost. They would have required 4 or 5 days more to ripen. The number of days from sowing to cutting was 143.

## WHEAT.

### TEST OF VARIETIES IN FIELD LOTS.

In this test nine varieties were used. On account of very strong winds, the varieties could not be all sown on the same day. The field used was uniformly even in soil, and had been fallowed the previous year. The cultivation consisted of one deep ploughing (seven to eight inches) in May, and four cultivations during the growing season. Two to three inches on top were stirred after the first ploughing, iron harrows, spring-tooth cultivator and three-furrow ploughs being used. One and one-half bushels seed was sown per acre, by hoe drill, with no harrowing or cultivating before or after seeding. Soil, clay loam.

WHEAT—FIELD LOTS.

| Name of Variety. | Size of Plot. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Acres | | | | In. | | In. | | Bush. | Lbs. | Lbs |
| Huron ............ | 1 | April 16.... | Aug. 31.... | 137 | 49 | Strong ... | $3\frac{1}{2}$ | Bearded .. | 40 | 24 | 62 |
| Monarch .......... | $\frac{1}{3}$ | " 16.... | Sept. 2.... | 139 | 50 | Medium .. | $3\frac{3}{4}$ | Bald ..... | 38 | 19 | 59 |
| Preston ........... | 4 | " 14.... | Aug. 29.... | 137 | 53 | Strong ... | $3\frac{1}{4}$ | Bearded .. | 38 | .. | $62\frac{1}{2}$ |
| Laurel ............ | $\frac{1}{3}$ | " 16.... | Sept. 7.... | 144 | 52 | " ... | 4 | Bald ..... | 37 | 56 | $59\frac{1}{2}$ |
| Stanley ........... | 3 | " 14.... | Aug. 29.... | 137 | 52 | " ... | $3\frac{1}{2}$ | " ..... | 37 | 18 | 61 |
| Red Fife...... . | 10 | " 9.... | Sept. 4.... | 148 | 50 | " .. | 4 | " ..... | 35 | 49 | 61 |
| Wellman's Fife.... | 4 | " 9.... | " 7.... | 151 | 53 | " ... | 4 | " ..... | 35 | 10 | 60 |
| White Fife........ | $\frac{1}{3}$ | " 16.... | " 7.... | 144 | 51 | " ... | $3\frac{1}{2}$ | " ..... | 34 | 50 | $57\frac{1}{2}$ |
| Percy . .......... | 3 | " 14.... | Aug. 31.... | 139 | 53 | " ... | $3\frac{1}{2}$ | " ..... | 30 | 18 | 59 |

WHEAT CROP AND AVERAGE YIELD.

| Variety. | Cultivation. | Acres. | Yield per Acre. | | Total Yield. | |
|---|---|---|---|---|---|---|
| | | | Bush. | Lbs. | Bush. | Lbs. |
| Huron | Fallow | 1 | 40 | 24 | 40 | 24 |
| Monarch | „ | ⅓ | 38 | 19 | 12 | 46 |
| Preston | „ | 4 | 38 | .. | 152 | .. |
| Laurel | „ | ⅓ | 37 | 56 | 12 | 38 |
| Stanley | „ | 3 | 37 | 18 | 111 | 54 |
| Red Fife | „ | 10 | 35 | 49 | 358 | 15 |
| Wellman's Fife | „ | 4 | 35 | 10 | 140 | 40 |
| White Fife | „ | ⅓ | 34 | 50 | 11 | 36 |
| Percy | „ | 3 | 30 | 18 | 90 | 54 |
| | | 26 | | | 931 | 7 |

Or an average of 35 bush. 48 lbs. per acre.

## SPRING WHEAT.

### TEST OF FERTILIZERS.

Six plots of one-fortieth acre each were sown May 14. Five of these were treated with artificial manures, and the sixth used as a check plot. They were sown with Red Fife wheat, by hoe-drill, at the rate of 1½ bushels per acre.

All plots in this test were so badly injured by rust that results of any value could not be obtained. Apparently there was no difference in the growth of straw. The check plot was as badly injured as those on which fertilizers were used. The land used for this test was summer-fallow; soil, clay loam.

WHEAT—TEST OF FERTILIZERS.

| Name of Variety. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Rusted. |
|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | |
| Plot No. 1—Nitrate of soda, 100 lbs. per acre (half sown when grain was 2 in. high, balance when 6 in. high) | May 14. | Sept. 1. | 110 | 46 | Strong.... | 4 | Bald.. | Badly injured by rust. |
| Plot No. 2—Nitrate of soda, 200 lbs. per acre (half sown when grain was 2 in. high, balance when 6 in. high) | „ 14. | „ 1. | 110 | 46 | „ .... | 4 | „ .. | „ |
| Plot No. 3—Superphosphate No. 1, 400 lbs. per acre (sown before grain and harrowed) | „ 14. | „ 1. | 110 | 46 | „ .... | 4 | „ .. | „ |
| Plot No. 4—Check plot, unfertilized | „ 14. | „ 1 | 110 | 46 | „ .... | 4 | „ .. | „ |
| Plot No. 5—Muriate of potash, 200 lbs. per acre (sown before grain and harrowed) | „ 14. | „ 1. | 110 | 46 | „ .... | 4 | „ .. | „ |
| Plot No. 6—Superphosphate No. 1, 200 lbs per acre; muriate of potash, 100 lbs. per acre; nitrate of soda, 100 lbs. per acre (half sown before grain and harrowed, and the balance when the grain was 2 in. high) | „ 14. | „ 1. | 110 | 46 | „ .... | 4 | „ .. | „ |

## FALL WHEAT.

Two varieties were sown on October 7, 1902. The soil being dry, little or no growth took place before winter set in; and this spring, both sorts being dead, the land was re-sown with flax.

## EXPERIMENTS WITH EMMER AND SPELT.

Two varieties of emmer and two of spelt were sown on one-twentieth or one-fortieth acre plots, and common emmer was also sown on one-quarter acre lot. They were sown on fallowed land, clay loam, by hoe-drill, at the rate of two bushels seed per acre.

SPELT AND EMMER—TEST OF VARIETIES.

| Name of Variety. | Size of Plot. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel Measure. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Acre. | | | | In. | | In. | | Lbs. | Bush. | Lbs. | Lbs. |
| Common Emmer ('Speltz')........ | 1·20 | April 18 | Sept. 8 | 143 | 47 | Strong. .. | 2 | Bearded | 3,320 | 54 | 40 | 33¼ |
| Red Emmer ........ | 1·40 | " 18 | " 8 | 143 | 49 | " .... | 2½ | " | 6,510 | 45 | 30 | 37 |
| White Spelt......... | 1 40 | " 18 | " 8 | 143 | 51 | " .... | 5 | Bald. .. | 5,620 | 39 | 40 | 28 |
| Black Bearded Spelt. | 1·40 | " 18 | " 8 | 143 | 50 | " .... | 5 | Bearded | 2,050 | 26 | 30 | 33 |
| Common Emmer .... | ¼ | May 5 | " 8 | 126 | 44 | " ... | 2 | " | ...... | 42 | 40 | |

In estimating the yields of these spelts and emmers, the bushel has been estimated at sixty pounds but no allowance has been made for the husk, which forms about twenty per cent of the total weight.

## SUMMER-FALLOWS.

In view of the great importance of properly preparing land for crops, I make no excuse for repeating in this what was stated in last year's report respecting summer-fallows and breaking up and cultivating new prairie land.

While grain on fallows the past year was more or less injured by frost in early September, it must be borne in mind that August last was the worst ripening month in the past 16 years, and that had the last week of that month been at all favourable, the largest crop for years would have been obtained on fallowed land. Another point should be considered. A great many have lately been working their fallows shallow early in the season, and later on ploughing deep, which naturally leaves the soil loose and exposed to drying winds. In a fall like that of 1902, in which no rain fell during the entire season, such cultivation defeats one of the objects of making a fallow at all, namely, conserving moisture.

While Red Fife wheat, on properly fallowed land, in few instances was entirely ripe and cut when frost came, a good deal was nearly so, and suffered only in loss of one or at the most two grades; while all sown on fallows ploughed deep in the fall were greatly injured.

In many cases, the seed, although sown in April, did not germinate until May 20, the dry fall and deep ploughing being the cause.

It is gratifying to know that throughout the Territories, summer-fallowing is rapidly becoming general. No matter where farming is carried on, the farmers realize that to be sure of a crop they must prepare a portion of their land the year before the crop is grown, and apart from the value of the stored moisture, there is the inestimable advantage of keeping weeds from overrunning the farm.

The true worth of properly prepared fallows has been clearly demonstrated in past years in every grain-growing district of Assiniboia.

The work of preparing land for crop by fallowing is carried on in so many ways in different parts of the Territories, that perhaps a few words on some of the methods employed may be of help to at least some of the new settlers.

It has been observed in Alberta and Saskatchewan that the land to be fallowed is not, as a rule, touched until the weeds are full grown, and in many cases bearing fully matured seed. It is then ploughed.

By this method, which no doubt saves work at the time, the very object of a summer-fallow is defeated. In the first place, moisture is not conserved, because the land has been pumped dry by the heavy growth of weeds; and secondly, instead of using the summer-fallow as a means of eradicating weeds, a foundation is laid for years of labour and expense by the myriads of foul seeds turned under.

The endless fields of yellow-flowered weeds, generally Ball Mustard (*Neslia paniculata*), testify to the indifferent work done in many districts, and while no weed is more easily eradicated by a good system of fallows, there is no weed that is more easily propagated or takes greater advantage of poor work on fallows or on fall or spring cultivation.

As has been pointed out in my previous reports, early and thorough work on fallows is absolutely necessary to success, and I here repeat the methods and results of tests carried on for some years past.

First méthod.—Ploughed deep (6 to 8 inches) before last of June; surface cultivated during the growing season, and just before or immediately after harvest ploughed 5 or 6 inches deep.

Result.—Too much late growth if season was at all wet; grain late in ripening, and a large crop of weeds if grain was in any way injured by winds.

Second method.—Ploughed shallow (3 inches deep) before the last of June; surface cultivated during the growing season, and ploughed shallow (3 to 4 inches deep) in the autumn.

Result.—Poor crop in a dry year; medium crop in a wet year. Not sufficiently stirred to enable soil to retain the moisture.

Third method.—Ploughed shallow (3 inches) before the last of June; surface cultivated during the growing season, and ploughed deep (7 to 8 inches) in the autumn.

Result.—Soil too loose and does not retain moisture. Crop light and weedy in a dry year.

Fourth method.—Ploughed deep (7 to 8 inches) before the last of June; surface cultivated during the growing season.

Result.—Sufficient moisture conserved for a dry year, and not too much for a wet one. Few or no weeds, as all the seeds near the surface have germinated and been killed. Surface soil apt to blow more readily than when either of the other methods is followed. For the past fourteen years the best, safest and cleanest grain has been grown on fallow worked in this way, and the method is therefore recommended.

Fallows that have been ploughed for the first time after the first of July, and especially after July 15, have never given good results; and the plan too frequently followed of waiting till weeds are full grown, and often ripe, and ploughing under with the idea of enriching the soil, is a method that cannot be too earnestly advised against.

In the first place, after the rains are over in June or early in July, as they usually are, no amount of work, whether deep or shallow ploughing, or surface cultivation, can put moisture in the soil. The rain must fall on the first ploughing and be conserved by surface cultivation.

Weeds, when allowed to attain their full growth, take from the soil all the moisture put there by the June rains, and ploughing under weeds with their seeds ripe or nearly so, is adding a thousand-fold to the myriads already in the soil, and does not materially enrich the land.

## BREAKING AND BACK-SETTING.

In view of the fact that every year brings to the Territories many new settlers, who are unacquainted with the methods of breaking up and preparing new land for crop, a few suggestions with regard to this very important work may not be amiss.

In all sections where the sod is thick and tough, breaking and back-setting should be done ; while in districts where scrub abounds and the sod is thin, deep breaking is all that is necessary.

The former is generally applicable to Assiniboia, and the latter to Alberta and Saskatchewan, especially to the northern parts of these Territories where the land is more or les scrubby..

### SHALLOW BREAKING.

(To be back-set).

The sod should be turned over as thin as possible, and for this purpose a walking plough with a 12 or 14-inch share, is the best. When the breaking is completed (which should not be later than the second week in July), rolling will hasten the rotting process and permit back-setting to commence early in August.

### BACK-SETTING.

Back-setting is merely turning the sod back to its original place, and at the same time bringing up two or three inches of fresh soil to cover it. The ploughing should be done in the same direction as the breaking and the same width of furrow turned. Two inches below the breaking is considered deep enough, but three or four inches will give better results.

After back-setting, the soil cannot be made too fine, and the use of disc or Randall harrow to cut up every piece of unrotted sod, will complete the work.

### DEEP BREAKING.

Deep breaking, which in many sections of the country is the only practicable way of preparing new land, and which is, unfortunately, done in some instances where breaking and back-setting would give more satisfactory results, consists in the turning over of the sod as deeply as possible; usually from four to five inches.

When the sod has rotted, the top soil should be worked and made as fine as possible. The use of harrow and disc will fill up all irregularities on the surface, and make a fine, even seed-bed.

Whether the land is broken shallow or deep, it is necessary to have the work completed early, so as to take advantage of the rains which usually come during June or early in July. These rains cause the sod to rot, and without them, or if the ploughing is done after they are over, the sod remains in the same condition as when turned, and no amount of work will make up for the loss.

To some districts near the foot-hills of the mountains and in districts where scrub abounds and the sod is thin, these remarks may not apply; but as a rule, throughout the Territories, early breaking, whether deep or shallow is advisable.

### WORKING LAND AFTER FIRST CROP.

Inquiries are often made as to what should be done after taking off the first crop on new land, the question being as to whether the land should be ploughed. or cultivated. or sown without any cultivation whatever.

This, however, can only be determined by circumstances. In districts with heavy clay soil, a satisfactory crop may be expected from burning the stubble of the former crop and sowing with or without cultivation; although a shallow cultivation after the stubble is burnt usually gives the best results.

In districts with light soils and especially with gravelly subsoil, cultivation before seeding is necessary.

After taking the second crop from breaking or back-setting, there can be no doubt that the land should be well fallowed to put it in proper condition for succeeding crops. If the fallow is well made and the process repeated every third year, the settler will have started on the right road to future success.

### SMUT.

On acount of many new settlers coming into the country each year that can have no idea of the prevalence of smut, especially in the wheat crop, and the serious loss caused by this fungous disease, I submit the results obtained during the past years on this farm for their guidance.

No tests were carried on the past season, as in former years, as it was thought sufficient information had been gained to ensure the safety of all crops, whether wheat, oats or barley, from this dangerous enemy.

Burnt or stinking smut in wheat is a fungous disease that attacks the grain more or less each year, and where at all bad, the crop is rendered unsaleable, and with only a few heads affected, if threshed in damp weather, the grade and price are reduced. No district is proof against smut, and though more prevalent in some seasons than others, it is wise to guard against all danger from this source each year. Three remedies have been tried repeatedly; these are, treating the seed with Bluestone (Copper Sulphate), with Formalin and with Massel powder. Bluestone, from cheapness, ease in application and effectual cure, has proven the best for wheat, while formalin has given the best results with smut in oats and barley. While formalin is not more expensive than bluestone, the application is more difficult in the seed having to be soaked longer.

For wheat apparently free from smut, 1 pound of blustone crushed and dissolved in warm water and mixed with 10 gallons water, and the seed sprinkled with, or dipped in the solution, is sufficient for 10 bushels. For wheat at all affected, 1 pound bluestone to 5 bushels seed is required. The seed can be sprinkled or dipped as is most convenient, but, in sprinkling, care must be taken that every grain is wet with the solution.

For smut in oats or barley, 1 pound of formalin (which is a liquid), is sufficient for 50 bushels seed. If the seed is smutty the solution should be 8 or 9 ounces formalin to 10 gallons of water; if not smutty, 4½ ounces to the same quantity of water.

The seed should be soaked from 5 minutes to 2 hours, according to condition of grain and strength of solution.

## EXPERIMENTS WITH OATS.

The oat tests, whether on small or large plots, gave good returns, with samples above the average. The land used in uniform tests and field lots had been fallowed the previous year, the cultivation consisting of one deep ploughing early in the spring, and surface cultivation afterwards. It will be seen that Banner oats gave much the best returns in field lots, and in the uniform test plots as well. This variety has in the past always given good yields, and without a doubt is a safe and satisfactory oat,—for Assiniboia at least.

### OATS—FIELD LOTS.

Nine varieties were sown from 22nd to 29th April. Soil clay loam. All varieties, except Waverley, which occupied high land, were badly lodged in spots. Black Beauty was almost entirely down, and had to be cut from one way.

| Number. | Name of Variety. | Size of Plot. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Acres | | | | In. | | In. | | Bush. | Lbs. | Lbs. |
| 1 | Banner | 5 | April 25 | Aug. 25 | 122 | 54 | Strong | 9 | Branching | 119 | 2 | 38 |
| 2 | Abundance | 3 | " 27 | " 29 | 124 | 56 | " | 9 | " | 106 | 0 | 39 |
| 3 | Wide Awake | 4 | " 24 | " 25 | 123 | 50 | " | 8 | " | 98 | 14 | 40 |
| 4 | Black Beauty | 3 | " 29 | " 31 | 124 | 53 | Weak | 9 | " | 97 | 13 | 36¼ |
| 5 | Thousand Dollar | 2 | " 28 | " 31 | 125 | 56 | Strong | 9 | " | 93 | 8 | 39 |
| 6 | Goldfinder | 4 | " 25 | " 31 | 128 | 56 | " | 9 | " | 91 | 21 | 38 |
| 7 | Improved Ligowo | 5 | " 25 | " 25 | 122 | 54 | " | 8 | " | 87 | 0 | 39½ |
| 8 | Tartar King | 5 | " 24 | " 22 | 120 | 54 | " | 10 | Sided | 86 | 12 | 41 |
| 9 | Waverley | 5 | " 22 | " 27 | 127 | 53 | " | 9 | Branching | 82 | 3 | 40 |

## OATS—TEST OF VARIETIES.

Forty-five varieties of oats were sown in this test. The plots were chiefly one-twentieth acre, with a few one-fortieth acre. They were sown on April 25, at the rate of 2 bushels of seed per acre. Nearly all the plots were lodged by rainstorms, but grain was well advanced, and no injury was done so far as the yield was concerned. The soil was a clay loam.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | Lbs. | Bush. | Lbs. | Lbs. | |
| 1 | Banner | Aug. 27 | 124 | 54 | Strong | 8 | Branching | 4,350 | 136 | 26 | 41 | Slightly. |
| 2 | Wide Awake | " 25 | 122 | 53 | " | 7 | " | 2,800 | 134 | 4 | 42 | " |
| 3 | Thousand Dollar | " 25 | 122 | 52 | " | 10 | " | 3,325 | 132 | 27 | 43 | |
| 4 | Lincoln | " 25 | 122 | 52 | " | 8 | " | 4,185 | 129 | 29 | 43 | |
| 5 | Holstein Prolific | " 26 | 123 | 50 | " | 9 | " | 3,750 | 127 | 32 | 42 | |
| 6 | Golden Beauty | " 25 | 122 | 52 | " | 10 | " | 5,380 | 127 | 2 | 41½ | |
| 7 | Kendal White | " 29 | 126 | 53 | " | 9 | " | 4,000 | 127 | 2 | 41 | |
| 8 | Buckbee's Illinois | " 26 | 123 | 50 | " | 8 | " | 3,965 | 126 | 31 | 41 | |
| 9 | Bavarian | " 28 | 125 | 50 | Weak | 8 | " | 4,870 | 126 | 26 | 40½ | " |
| 10 | Swedish Select | " 29 | 126 | 47 | Strong | 8 | " | 5,060 | 126 | 16 | 43½ | |
| 11 | Improved American | " 25 | 122 | 53 | " | 8 | " | 4,340 | 125 | 10 | 42 | |
| 12 | Irish Victor | " 26 | 123 | 56 | " | 9 | " | 2,225 | 123 | 33 | 42½ | |
| 13 | American Triumph | " 28 | 125 | 51 | " | 9 | " | 2,680 | 123 | 18 | 41 | |
| 14 | Golden Tartarian | " 29 | 126 | 50 | " | 11 | Sided | 3,180 | 122 | 32 | 41½ | |
| 15 | Abundance | " 26 | 123 | 50 | " | 9 | Branching | 4,425 | 122 | 27 | 42½ | |
| 16 | Black Beauty | " 26 | 123 | 47 | Weak | 8 | " | 4,180 | 122 | 12 | 37½ | |
| 17 | Olive Black | " 31 | 128 | 57 | Strong | 11 | Sided | 4,500 | 121 | 26 | 40 | " |
| 18 | White Giant | " 25 | 122 | 50 | " | 9 | Branching | 4,665 | 121 | 21 | 42 | |
| 19 | Sensation | " 25 | 122 | 58 | " | 9 | " | 3,070 | 121 | 16 | 43 | |
| 20 | Golden Fleece | " 31 | 128 | 52 | " | 10 | " | 5,890 | 120 | 30 | 41 | " |
| 21 | Early Golden Prolific | " 29 | 126 | 56 | Medium | 8 | " | 5,280 | 120 | .. | 42 | " |
| 22 | Mennonite | " 26 | 123 | 51 | Weak | 10 | " | 4,730 | 119 | 24 | 42 | |
| 23 | Milford White | " 29 | 126 | 58 | Strong | 11 | Sided | 4,580 | 119 | 14 | 41 | |
| 24 | Golden Giant | " 29 | 126 | 48 | " | 10 | " | 3,820 | 118 | 18 | 40½ | |
| 25 | Goldfinder | " 31 | 128 | 54 | " | 9 | Branching | 2,880 | 117 | 22 | 41 | |
| 26 | Kendal Black | " 29 | 126 | 50 | " | 10 | Sided | 4,980 | 117 | 2 | 41 | |
| 27 | Salines | " 27 | 124 | 53 | " | 11 | Branching | 3,975 | 116 | 1 | 40 | |
| 28 | American Beauty | " 26 | 123 | 56 | " | 10 | " | 5,530 | 115 | 20 | 41 | " |
| 29 | Pense White | " 29 | 126 | 54 | " | 10 | Sided | 3,360 | 115 | 10 | 41 | " |
| 30 | Danish Island | " 25 | 122 | 51 | " | 8 | Branching | 5,450 | 115 | .. | 42 | |
| 31 | Pense Black | " 31 | 128 | 60 | " | 13 | Sided | 5,810 | 115 | .. | 42 | |
| 32 | Milford Black | " 29 | 126 | 50 | " | 11 | " | 5,100 | 114 | 24 | 41½ | " |
| 33 | New Zealand | Sept. 5 | 133 | 54 | Weak | 11 | " | 2,610 | 112 | 22 | 41 | |
| 34 | Columbus | Aug. 21 | 126 | 44 | " | 9 | Branching | 2,440 | 111 | 26 | 39 | |
| 35 | Improved Ligowo | " 25 | 122 | 55 | Strong | 8 | " | 2,920 | 111 | 26 | 44¼ | |
| 36 | Twentieth Century | " 25 | 122 | 50 | " | 8 | " | 2,480 | 110 | 20 | 42½ | |
| 37 | Olive White | " 29 | 126 | 53 | " | 10 | Sided | 5,240 | 109 | 14 | 40 | |
| 38 | Waverley | " 26 | 123 | 57 | " | 10 | Branching | 3,020 | 108 | 28 | 43½ | |
| 39 | White Schonen | " 19 | 116 | 46 | " | 9 | " | 4,160 | 105 | 30 | 41½ | |
| 40 | Joanette | " 30 | 127 | 47 | Weak | 9 | " | 5,000 | 104 | 19 | 40 | |
| 41 | Pioneer | " 26 | 123 | 50 | Strong | 7 | " | 4,005 | 100 | 15 | 43½ | |
| 42 | Scotch Potato | " 26 | 123 | 57 | " | 10 | " | 3,785 | 100 | 15 | 42 | " |
| 43 | Tartar King | " 25 | 122 | 50 | " | 9 | " | 2,760 | 97 | 22 | 44½ | |
| 44 | Wallis | " 28 | 125 | 55 | " | 9 | " | 4,480 | 97 | 22 | 42 | |
| 45 | Siberian | Sept. 5 | 133 | 59 | Weak | 12 | Sided | 2,705 | 89 | 9 | 39 | |

TOTAL YIELD FROM FIELD CROPS OF OATS.

| Variety. | Cultivation. | Acres. | Yield per Acre. | | Total Yield. | |
|---|---|---|---|---|---|---|
| | | | | | Bush. | Lbs. |
| Banner | Fallow | 5 | 119 | 2 | 595 | 10 |
| Abundance | " | 3 | 106 | .. | 318 | |
| Wide Awake | " | 4 | 98 | 14 | 393 | 22 |
| Black Beauty | " | 3 | 97 | 13 | 292 | 5 |
| Thousand Dollar | " | 2 | 93 | 8 | 186 | 16 |
| Goldfinder | " | 4 | 91 | 21 | 366 | 16 |
| Improved Ligowo | " | 5 | 87 | .. | 435 | |
| Tartar King | " | 5 | 86 | 12 | 431 | 26 |
| Waverley | " | 5 | 82 | 3 | 410 | 15 |
| | | 36 | | | 3,429 | 8 |

An average of 95 bushels 8 pounds per acre.

## EXPERIMENTS WITH BARLEY.

The barley tests, whether grown on field lots or on small plots, gave good returns. Repeated rains and heavy dews coloured the grain, but otherwise the sample is good.

### FIELD LOTS.

Mensury and Odessa were sown on Brome sod broken and back-set the previous year. The balance of the varieties were on fallowed land, cultivated the same as for wheat. Sidney, in addition to what was sown on fallow, was ploughed in on stubble land, 3 inches deep, for feeding purposes. Odessa came up thin on account of the soil being very dry when sown, which accounts for the yield being small. Soil clay loam.

BARLEY—FIELD LOTS.

| Name of Variety | Cultivation. | Size of Plot. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Acres. | | | | Ins. | | Inches. | | Bush. | Lbs. | Lbs. |
| Royal | Fallow | 2 | Ap'l 25 | Aug. 10 | 107 | 34 | Strong.. | 2½ | 6-rowed. | 67 | 3 | 51 |
| Claude | " | 1 | " 29 | " 25 | 118 | 41 | " .. | 2½ | " | 66 | | 50 |
| Standwell | " | 3 | " 29 | " 25 | 118 | 50 | Medium | 2¾ | 2-rowed. | 63 | 20 | 53 |
| Invincible | " | 4 | " 27 | " 28 | 123 | 43 | " | 3¼ | " | 59 | 25 | 53 |
| Mensury | Brome s | 5 | " 30 | " 12 | 104 | 45 | Strong.. | 3 | 6-rowed. | 56 | 12 | 49 |
| Sidney | Fallow | 6 | " 30 | " 21 | 113 | 46 | " .. | 3½ | 2-rowed. | 54 | 20 | 52 |
| Canadian Thorpe | " | 4 | " 28 | " 21 | 115 | 50 | " .. | 3 | " | 53 | 39 | 52 |
| Mansfield | " | 1 | " 29 | " 25 | 118 | 44 | " .. | 2¾ | 6-rowed. | 50 | | 52 |
| Odessa | Brome s | 4 | May 1 | " 12 | 103 | 42 | " .. | 2½ | " | 48 | 28 | 51 |

### BARLEY—UNIFORM TEST PLOTS.

Fifteen varieties of 2-rowed, and twenty varieties of 6-rowed barley were tested on one-twentieth or one-fortieth acre plots. The soil was clay loam. They were all sown on April 29, all the varieties came up evenly and gave large returns.

### BARLEY, TWO-ROWED—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ins. | | Inches. | | Lbs. | Bush. | Lbs. | Lbs. |
| 1 | Standwell.... .... ........ | Aug. 22 | 115 | 51 | Weak.. | 3 | 2-rowed.. | 2,520 | 80 | 40 | 54 |
| 2 | Invincible................. | " 22 | 115 | 50 | " | 3¼ | " .. | 4,900 | 77 | 14 | 54 |
| 3 | French Chevalier .. .. .... | " 24 | 117 | 41 | Medium | 4 | " .. | 4,930 | 71 | 22 | 53 |
| 4 | Canadian Thorpe. ........ | " 15 | 108 | 53 | Strong.. | 3 | " .. | 4,150 | 71 | 2 | 51½ |
| 5 | Danish Chevalier. ........ | " 24 | 117 | 40 | Weak.. | 3 | " .. | 3,280 | 66 | 2 | 52 |
| 6 | Gordon ... ......... .... | " 14 | 107 | 51 | Strong.. | 3 | " .. | 4,100 | 64 | 28 | 52 |
| 7 | Sidney..................... | " 15 | 108 | 46 | " .. | 3¼ | " .. | 3,500 | 62 | 24 | 54½ |
| 8 | Logan...... ...... ...... | " 12 | 105 | 48 | " .. | 3 | " .. | 4,810 | 62 | 14 | 51½ |
| 9 | Jarvis.... ... ... . .... | " 15 | 108 | 50 | " .. | 3 | " .. | 4,430 | 61 | 22 | 50 |
| 10 | Newton ... .... ....... | " 22 | 115 | 48 | Medium | 3 | " .. | 3,470 | 61 | 2 | 53 |
| 11 | Fulton....... ........... | " 10 | 103 | 55 | Strong.. | 3 | " . | 4,050 | 58 | 46 | 51 |
| 12 | Harvey................. | " 10 | 103 | 50 | " .. | 3¾ | " .. | 5,200 | 58 | 16 | 51 |
| 13 | Clifford.... ........... | " 12 | 105 | 50 | " .. | 3 | " .. | 5,250 | 57 | 14 | 51 |
| 14 | Beaver .. .... ...... .... | " 19 | 112 | 40 | Medium | 3 | " .. | 5,460 | 56 | 12 | 52 |
| 15 | Dunham ................. | " 16 | 109 | 44 | " .. | 3¼ | " .. | 6,220 | 52 | 14 | 52½ |

### BARLEY, SIX-ROWED—TEST OF VARIETIES.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Odessa..................... | Aug. 13 | 106 | 42 | Strong.. | 2½ | 6-rowed... | 1,900 | 71 | 12 | 51½ |
| 2 | Claude.................. | " 19 | 112 | 39 | " .. | 3 | " .. | 3,080 | 65 | 40 | 49 |
| 3 | Trooper.................. | " 17 | 110 | 40 | " .. | 2¾ | " .. | 3,080 | 64 | 8 | 52 |
| 4 | Mensury...... .......... | " 15 | 108 | 41 | " .. | 3 | " .. | 3,440 | 63 | 36 | 50½ |
| 5 | Brome.................... | " 20 | 113 | 38 | " .. | 2½ | " .. | 3,100 | 63 | 26 | 52 |
| 6 | Mansfield............. ... | " 15 | 108 | 41 | " .. | 2½ | " .. | 3,130 | 63 | 6 | 52½ |
| 7 | Summit............. ..... | " 20 | 113 | 40 | " .. | 3 | " .. | 3.760 | 61 | 2 | 53 |
| 8 | Common..... ........... | " 13 | 106 | 37 | " .. | 2 | " .. | 2,800 | 60 | 20 | 53 |
| 9 | Royal...................... | " 17 | 110 | 38 | " .. | 2½ | " .. | 3,720 | 60 | .. | 53 |
| 10 | Rennie's Improved.......... | " 13 | 106 | 37 | " .. | 2 | " . | 2,850 | 57 | 14 | 54 |
| 11 | Empire......... ...... | " 20 | 113 | 39 | " .. | 3 | " .. | 4,120 | 56 | 32 | 51¼ |
| 12 | Argyle......... ......... | " 18 | 111 | 42 | " .. | 2½ | " .. | 3,040 | 56 | 32 | 52 |
| 13 | Garfield ... ............ | " 18 | 111 | 40 | " .. | 2½ | " .. | 3,250 | 55 | 30 | 52 |
| 14 | Oderbruch................ | " 14 | 107 | 39 | " .. | 2½ | " .. | 2,270 | 54 | 38 | 54 |
| 15 | Nugent... . .... ......... | " 19 | 112 | 40 | " .. | 3 | " .. | 4,260 | 54 | 28 | |
| 16 | Stella......... .. ...... | " 19 | 112 | 38 | " .. | 3 | " .. | 2,865 | 54 | 3 | 52¼ |
| 17 | Yale.......... .... .... | " 19 | 112 | 40 | " .. | 2½ | " .. | 4,970 | 53 | 46 | 51 |
| 18 | Albert.................... | " 15 | 108 | 39 | " .. | 2¾ | " .. | 3,030 | 53 | 26 | 53½ |
| 19 | Baxter........ .... .... | " 15 | 108 | 42 | " .. | 2 | " .. | 3,580 | 50 | 20 | 53 |
| 20 | Champion. . .. .......... | " 10 | 103 | 42 | " .. | 2½ | " .. | 3,000 | 45 | 20 | 48 |

### BARLEY CROP AND AVERAGE YIELD.

| Variety. | Cultivation. | Acres. | Yield per Acre. | | Total Yield | |
|---|---|---|---|---|---|---|
| | | | Bush. | Lbs. | Bush. | Lbs. |
| Royal...... ..... ... ......... .... .... .... .... | Fallow ...... | 2 | 67 | 3 | 134 | 6 |
| Claude.......... ............ .................. | " .... | 1 | 66 | .. | 66 | .. |
| Standwell........................ .. .. .. .. | " ........ | 3 | 63 | 20 | 190 | 12 |
| Invincible.... ...... . . . ....... .. ... .... .. | " ... ... | 4 | 59 | 25 | 258 | 4 |
| Mensury......... ....; ................................ | Brome sod.... | 5 | 56 | 12 | 281 | 12 |
| Sidney.................................. ........ . | Fallow ....... | 6 | 54 | 20 | 326 | 24 |
| Canadian Thorpe .. . .......... ............... | " ...... | 4 | 53 | 39 | 215 | 12 |
| Mansfield .................................. .... | " ....... | 1 | 50 | .. | 50 | .. |
| Odessa................................................ | Brome sod.... | 4 | 48 | 28 | 194 | 16 |
| Total ...... .... ......... ........ | ......... .... | 30 | ...... | ..... | 1,695 | 38 |

An average of 56 bushels 25 pounds per acre.

## EXPERIMENTS WITH PEASE.

Forty varieties of pease were sown on fallowed land, clay loam on one-twentieth acre plots, on May 5, at the rate of 2 bushels of small, 2½ bushels of medium and 3 bushels of large pease per acre. As will be seen, only four sorts were ripe when frost came. The balance matured afterwards, but were injured more or less.

All varieties were very heavy in straw, and well podded, but the cool, wet weather early in September delayed the ripening.

PEASE—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Character of Growth. | Length of Straw. | Length of Pod. | Size of Pea. | Yield per Acre | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | In. | In. | | Bus. | lbs. | Lbs. |
| 1 | Early Britain | Sept. 8.. | 126 | Strong... | 53 | 2½ | Medium .. | 60 | 30 | 60½ |
| 2 | Paragon | " 12.. | 130 | " .... | 54 | 3 | " .. | 60 | .. | 61½ |
| 3 | Gregory | " 12.. | 130 | " .... | 60 | 2½ | " .. | 59 | 10 | 62½ |
| 4 | Mackay | " 14.. | 132 | " .... | 51 | 3 | " .. | 57 | 50 | 61 |
| 5 | King | " 13.. | 131 | " .... | 48 | 2½ | " .. | 56 | 30 | 62 |
| 6 | English Gray | " 8.. | 126 | " . . | 56 | 3 | " .. | 55 | 50 | 60 |
| 7 | Prussian Blue | " 8.. | 126 | " .... | 50 | 2¾ | Small.. .. | 55 | 50 | 62 |
| 8 | Macoun | " 13.. | 131 | " .... | 56 | 3 | Medium.. | 55 | 30 | 59 |
| 9 | Wisconsin Blue | " 16.. | 134 | " .... | 60 | 2¾ | Small .... | 55 | 10 | 58½ |
| 10 | Archer | " 10.. | 128 | " .... | 52 | 3 | Medium.. | 53 | 10 | 61½ |
| 11 | Pride | " 10.. | 128 | " .... | 57 | 3 | " .. | 53 | 10 | 62½ |
| 12 | Bruce | " 10.. | 128 | " .... | 53 | 2½ | " .. | 52 | 50 | 60 |
| 13 | Black-eyed Marrowfat | " 10.. | 128 | " .... | 48 | 2¾ | " .. | 50 | 30 | 62 |
| 14 | Alma | " 16.. | 134 | " . . . | 54 | 2½ | Small ... | 50 | 10 | 63½ |
| 15 | Carleton | " 16.. | 134 | " ... | 65 | 2½ | " .... | 49 | 50 | 60 |
| 16 | Kent | " 14.. | 132 | " .... | 58 | 3 | Medium.. | 49 | 10 | 62 |
| 17 | New Potter | " 10.. | 128 | " .... | 52 | 2¼ | " .. | 49 | 10 | 61 |
| 18 | German White | " 8.. | 126 | " .. | 48 | 2½ | " .. | 49 | 10 | 64½ |
| 19 | Picton | " 6.. | 124 | " ... . | 48 | 2½ | " .. | 48 | 30 | 62½ |
| 20 | Perth | " 6.. | 124 | " .... | 55 | 2½ | " .. | 47 | 50 | 61½ |
| 21 | Agnes | " 6.. | 121 | " .... | 50 | 2½ | " .. | 46 | 50 | 62½ |
| 22 | Elliot | " 10.. | 128 | " .... | 56 | 2½ | " .. | 46 | 50 | 61 |
| 23 | Nelson | " 8.. | 126 | " .... | 50 | 2½ | " .. | 45 | 30 | 62 |
| 24 | Pearl | " 8.. | 126 | " .... | 53 | 2½ | " .. | 45 | 30 | 62 |
| 25 | Duke | " 15.. | 133 | " .... | 57 | 3 | " .. | 45 | 10 | 62½ |
| 26 | Prince | " 8.. | 126 | " .... | 50 | 2¾ | Large .... | 45 | 10 | 63½ |
| 27 | Lanark | " 8.. | 126 | " .... | 50 | 2½ | " .... | 44 | 50 | 63 |
| 28 | Centennial | " 8.. | 126 | " .... | 50 | 3 | Medium.. | 44 | 50 | 60½ |
| 29 | Fergus | " 16.. | 134 | " .... | 63 | 2¼ | " .. | 44 | 30 | 53 |
| 30 | Large White Marrowfat | " 6.. | 124 | " .... | 57 | 2¾ | Large .. | 43 | 30 | 62½ |
| 31 | Arthur | " 6.. | 124 | " .... | 48 | 2¼ | " .... | 42 | 10 | 65 |
| 32 | Daniel O'Rourke | " 3.. | 121 | " .... | 50 | 2¼ | Small .... | 41 | 10 | 62 |
| 33 | Crown | " 3.. | 121 | " .... | 52 | 2 | " . . | 40 | 50 | 63 |
| 34 | Trilby | " 14.. | 132 | " .... | 56 | 3 | Medium.. | 39 | 50 | 63 |
| 35 | Golden Vine | " 3.. | 121 | " ... | 47 | 2 | " .. | 39 | 10 | 64 |
| 36 | Victoria | " 10.. | 128 | " .... | 60 | 2½ | " .. | 38 | 10 | 60¼ |
| 37 | Chancellor | " 6.. | 124 | " .... | 50 | 2½ | " .. | 37 | 30 | 63 |
| 38 | Mummy | " 6.. | 124 | " .... | 50 | 2¼ | Small .... | 37 | 30 | 62½ |
| 39 | Prince Albert | " 8.. | 126 | " .... | 60 | 2½ | " ... | 37 | 30 | 61 |
| 40 | White Wonder | Aug. 28.. | 115 | " .... | 46 | 2¼ | Medium.. | 31 | 30 | 62 |

## ROTATION OF CROPS.

The rotation tests which were commenced in 1899, were continued this year.

All land was ploughed in fall of 1902 that had been in crop that year, and the five half acres of beans, pease, tares and clovers had been ploughed as these crops attained their greatest growth, and all harrowed and put in as good condition as the dry state of the soil would permit.

The grain of the stubble half acres came up very thin, and though the rains in May caused a second germination, the crop was a very light one. Rust also struck the wheat plots, causing a very small yield.

The following rotation has been carried out since 1899.

ROTATION OF CROPS.

| No. | 1899. | 1900. | 1901. | 1902. | 1903. |
|---|---|---|---|---|---|
| 1 | Wheat | Oats | Soja Beans | Wheat | Oats |
| 2 | " | Wheat | Pease | " | Wheat |
| 3 | " | Oats | Tares | " | Oats |
| 4 | " | Wheat | Red Clover | " | Wheat |
| 5 | " | Barley | Alsike and Lucerne | " | Barley |
| 6 | Pease | Wheat | Wheat | Pease | Wheat |
| 7 | Tares | " | Oats | Tares | " |
| 8 | Soja Beans | " | " | Soja Beans | " |
| 9 | Red Clover | " | Wheat | Red Clover | " |
| 10 | Alsike & Lucerne | " | Barley | Alsike & Lucerne | " |
| 11 | Rape | " | Summer-fallow | Rape | " |
| 12 | Wheat | " | " | Wheat | " |
| 13 | " | Oats | " | " | Oats |
| 14 | " | Barley | " | " | Barley |
| 15 | " | Wheat | Oats | " | Wheat |
| 16 | " | Barley | " | " | Barley |
| 17 | Oats | Soja Beans | Wheat | Oats | Soja Beans |
| 18 | Wheat | Pease | " | Wheat | Pease |
| 19 | Oats | Tares | " | Oats | Tares |
| 20 | Wheat | Red Clover | " | Wheat | Red Clover |
| 21 | Barley | Alsike & Lucerne | " | Barley | Alsike & Lucerne |
| 22 | Rye | Summer-fallow | " | Rye | Summer-fallow |

ROTATION TEST.—Results obtained in 1903. Plots, ½ acre each. Soil, clay loam.

| Number. | Name of Variety. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Yield per Acre. | | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | In. | | In. | | Bus. | lbs. | |
| 1 | Oats, Banner | April 29 | Aug. 20 | 113 | 47 | Strong | 9 | Branching | 47 | 12 | |
| 2 | Wheat, Red Fife | " 15 | " 31 | 138 | 41 | " | 3 | Bald | 16 | 2 | Badly. |
| 3 | Oats, Banner | " 29 | " 29 | 122 | 39 | " | 9 | Branching | 43 | 18 | |
| 4 | Wheat, Red Fife | " 15 | " 31 | 138 | 40 | " | 3½ | Bald | 15 | 30 | " |
| 5 | Barley, Canad'n Thorpe | " 29 | " 28 | 121 | 39 | " | 2¾ | Two-rowed | 20 | 40 | |
| 6 | Wheat, Red Fife | " 15 | Sept. 8 | 146 | 43 | " | 3¼ | Bald | 24 | 8 | Considerably. |
| 7 | " " | " 15 | " 8 | 146 | 44 | " | 3½ | " | 24 | 28 | " |
| 8 | " " | " 15 | " 8 | 116 | 43 | " | 3½ | " | 22 | 58 | " |
| 9 | " " | " 15 | " 8 | 146 | 43 | " | 3½ | " | 20 | 52 | " |
| 10 | " " | " 15 | " 8 | 146 | 44 | " | 3¼ | " | 23 | 14 | " |
| 11 | " " | " 15 | " 8 | 146 | 43 | " | 3½ | " | 20 | 20 | " |
| 12 | " " | " 15 | Aug. 21 | 123 | 45 | " | 4 | " | 14 | 16 | Badly. |
| 13 | Oats, Banner | " 29 | " 20 | 113 | 38 | " | 8 | Branching | 42 | 12 | |
| 14 | Barley, Canad'n Thorpe | " 29 | " 18 | 111 | 36 | " | 2½ | Two-rowed | 18 | 36 | |
| 15 | Wheat, Red Fife | " 15 | " 31 | 138 | 45 | " | 3½ | Bald | 15 | 40 | Considerably. |
| 16 | Barley, Canad'n Thorpe | " 29 | " 28 | 121 | 37 | " | 3 | Two-rowed | 20 | .. | |
| 17 | Soja Beans | May 16 | Ploughed under, Aug. 5 | | | | | | | | |
| 18 | Pease | " 21 | " July 28 | | | | | | | | |
| 19 | Tares | " 21 | " Aug. 5 | | | | | | | | |
| 20 | Red Clover | " 16 | " Oct. 21 | | | | | | | | |
| 21 | Alsike and Lucerne | " 16 | " " 21 | | | | | | | | |
| 22 | Summer-fallow | | | | | | | | | | |

## EXPERIMENTS WITH FLAX.

Several tests as to quantity of seed per acre, and different dates of seeding were made, but unfortunately the plots were on low ground, and very heavy rains destroyed the tests.

Two acres of Western Rye Grass sod, ploughed early in May were sown with flax on May 21, and harvested August 20. Yield per acre, 12 bushels.

Three-quarters of an acre of fallowed land was sown with flax on May 5. Ripe September 2. Yield per acre, 10 bushels.

## EXPERIMENT WITH CANARY GRASS.

*(Phalaris Canariensis).*

Sown April 30 on one-twentieth acre plot of fallowed land. Cut September 8. Days to mature, 131 days. Straw, strong; 33 inches long. Weight of straw per acre, 3,960 pounds. Head, 1½ inches. Yield per acre, 29 bushels 20 pounds. Weight per bushel, 48 pounds.

## EXPERIMENT WITH SUNFLOWERS.

Russian variety, sown May 22. Produced heads, but no seed had formed when frost came and destroyed the crop.

## EXPERIMENT WITH TARES.

One-twentieth acre of fallowed land was sown with tares on May 5; ripe September 10; days to mature, 128; length of straw, 40 inches; pod, 2¼ inches. Yield per acre, 24 bushels 10 pounds. Weight per bushel, 54 pounds.

## EXPERIMENTS WITH MILLETS.

Six varieties were sown on May 16, on one-twentieth or one-fortieth acre plots of fallow. Did not mature. Cut for feed on September 5, on account of frost. Two varieties did not germinate and were ploughed up.

| Variety. | Size of Plot. | Height | Yield per Acre. | |
|---|---|---|---|---|
| | Acre. | Inches. | Tons. | Lbs. |
| Hungarian | 1-20 | 43 | 6 | ... |
| White Round French | 1-40 | 50 | 6 | ... |
| Italian | 1-40 | 43 | 4 | ... |
| Red Orenburg | 1-40 | 46 | 3 | 800 |
| Algerian | 1-40 | Did not germnate. | | |
| Pearl | 1-40 | | | |

## EXPERIMENTS WITH SOJA BEANS.

Sown May 16, on fallowed land. No pods formed.

| Variety. | Rows Distance Apart. | Height. | Yield per Acre. (Green.) | |
|---|---|---|---|---|
| | Inches. | Inches. | Tons. | Lbs. |
| Soja beans | 21 | 20 | 3 | 1,544 |
| " | 28 | 20 | 2 | 1,668 |
| " | 35 | 21 | 1 | 1,393 |

Cutting Banner Oats at Indian Head.

## EXPERIMENTS WITH HORSE BEANS.

Sown in drills on fallowed land on May 16.

| Variety. | Rows Distance Apart. | Height. | Yield per Acre. (Green.) | |
|---|---|---|---|---|
| | Inches. | Inches. | Tons. | Lbs. |
| Horse beans | 21 | 46 | 15 | 176 |
| " | 28 | 46 | 12 | 1,496 |
| " | 35 | 44 | 14 | 866 |

## EXPERIMENT WITH FALL RYE.

Sown October 7, 1902, on one-twelfth acre plot of fallow. Ripe August 20. Straw, strong; 61 inches long. Head, 4½ inches long. Yield per acre, 46 bushels 20 pounds.

## EXPERIMENT WITH SPRING RYE.

Sown April 18, on one-twentieth acre plot of fallow. Ripe August 22. Days to mature, 126. Straw, strong; 50 inches long. Head, 4 inches long. Weight of straw, 4,540 pounds per acre. Yield per acre, 38 bushels. Weight per bushel, 57 pounds.

## HAY CROP.

The yield of Brome hay on account of the dry spring was small, but Western Rye Grass, which is later in starting and did not suffer so badly, gave satisfactory returns.

Alfalfa, which gave a small yield in first cutting, improved greatly through the wet weather of August, and the second cutting was better.

Timothy gave a good return.

### YIELDS.

### Brome Grass (*Bromus inermis*).

Fifteen acres Brome, second year.—Cut July 13 and 15; yield, 1 ton 733 lbs. per acre.

### Western Rye Grass (*Agropyrum tenerum*).

Four acres, third year.—Cut July 13; yield, 2 tons 148 lbs. per acre.
Twelve acres, second year.—Cut July 22; yield, 2 tons 166 lbs. per acre.
Three acres, first crop.—Cut July 24; yield, 2 tons 1,530 lbs. per acre.

### Alfalfa.

One-half acre.—First cutting, July 13; yield, 1,560 lbs. per acre. Second cutting, September 3; yield, 1 ton 252 lbs. per acre.

### Timothy.

One-half acre.—Cut July 13; yield, 2 tons per acre.

Twenty-four acres of Brome Grass, first crop, was pastured.

Thirty acres of Brome Grass, which have been cut for hay from three to six years, were broken up, and a portion back-set and made ready for crop.

## EXPERIMENTS WITH INDIAN CORN.

Twenty-four varieties of Indian corn were sown on May 22, in clay loam in drills 36 inches apart, and also in hills three feet apart each way. In addition, three varieties were sown on May 27, in rows at different distances apart. The yield was computed from the weight of two rows, each 66 feet long.

The land was fallowed the previous year and 10 loads of well-rotted manure per acre spread over it after frost came, and cultivated in, as lightly as possible, before seeding.

The corn was cut on September 8 and 9, and cut up and put in silo after wilting two or three days. In addition to the experimental tests, six acres were sown for ensilage.

INDIAN CORN—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of sowing. | Character of Growth. | Height. | Condition when cut. | Weight per Acre grown in rows. | | Weight per Acre grown in hills. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | Bush. | Lbs. | Bush. | Lbs. |
| 1 | Angel of Midnight | May 22. | Very strong. | 77 | Early milk | 25 | 600 | 22 | |
| 2 | Eureka | " | Strong | 80 | Tassel | 20 | 700 | 19 | 1,600 |
| 3 | Yellow Dakota Flint | " | " | 70 | Early milk | 20 | 700 | 17 | 1,200 |
| 4 | Longfellow | " | " | 72 | " | 19 | 1,600 | 18 | 1,400 |
| 5 | North Dakota White | " | " | 75 | Tassel | 19 | 500 | 18 | 1,400 |
| 6 | Salzer's All Gold | " | " | 78 | " | 19 | 500 | 21 | 1,560 |
| 7 | Early Mastodon | " | " | 77 | " | 18 | 300 | 13 | 400 |
| 8 | Mammoth 8-rowed Flint | " | " | 75 | Early milk | 18 | 300 | 18 | 1,400 |
| 9 | Rural Thoro'bred White Flint | " | " | 73 | Not in tassel | 18 | 300 | 22 | 1,100 |
| 10 | Compton's Early | " | " | 70 | Early milk | 17 | 1,200 | 13 | 1,500 |
| 11 | Superior Fodder | " | " | 71 | Not in tassel | 16 | 1,000 | 14 | 1,700 |
| 12 | Sanford | " | " | 70 | Early milk | 16 | 560 | 16 | 1,000 |
| 13 | Early Butler | " | " | 77 | Tassel | 15 | 1,900 | 15 | 800 |
| 14 | King Philip | " | " | 70 | " | 15 | 1,900 | 14 | 600 |
| 15 | Giant Prolific Ensilage | " | " | 74 | " | 19 | 800 | 13 | 1,400 |
| 16 | Champion White Pearl | " | " | 70 | " | 14 | 1,700 | 13 | 400 |
| 17 | White Cap Yellow Dent | " | " | 70 | Early milk | 14 | 1,700 | 15 | 800 |
| 18 | Mammoth Cuban | " | " | 70 | Tassel | 13 | 1,500 | 13 | 400 |
| 19 | Pride of the North | " | " | 80 | " | 13 | 1,500 | 13 | 400 |
| 20 | Selected Leaming | " | " | 67 | " | 13 | 400 | 13 | 400 |
| 21 | King of the Earliest | " | " | 77 | Early milk | 12 | 1,300 | 12 | 200 |
| 22 | Evergreen Sugar | " | " | 65 | Tassel | 12 | 1,300 | 12 | 200 |
| 23 | Cloud's Early Yellow | " | Medium | 67 | " | 11 | 1,100 | 11 | |
| 24 | Red Cob Ensilage | " | " | 70 | Not in tassel | 11 | ... | 14 | 1,700 |

INDIAN CORN—TEST OF SEEDING AT DIFFERENT DISTANCES.

Sown in rows by grain seeder May 27; cut September 9. Cultivation of land the same as for preceding test.

| Name of Variety. | Character of Soil. | Distance between rows. | Character of Growth. | Height. | Weight per Acre grown in rows. | |
|---|---|---|---|---|---|---|
| | | Inches. | | Inches. | Tons. | Lbs. |
| Longfellow | Clay loam | 21 | Strong | 70 | 24 | 930 |
| " | " | 28 | " | 68 | 17 | 1,425 |
| " | " | 35 | " | 69 | 12 | 904 |
| " | " | 42 | " | 68 | 13 | 1,347 |
| Champion White Pearl | " | 21 | " | 58 | 18 | 1,720 |
| " | " | 28 | " | 57 | 18 | 842 |
| " | " | 35 | " | 53 | 15 | 564 |
| " | " | 42 | " | 55 | 13 | 875 |
| Selected Leaming | " | 21 | " | 50 | 16 | 1,005 |
| " | " | 28 | " | 54 | 20 | 384 |
| " | " | 35 | " | 51 | 15 | 1,696 |
| " | " | 42 | " | 48 | 11 | 1,575 |

## EXPERIMENTS WITH FIELD ROOTS.

Fallowed land, with 10 to 12 loads of well-rotted manure per acre, was used for the tests with field roots. The manure was evenly spread on the surface after frost came, and in the spring was lightly ploughed in with three-furrow ploughs. Soil, clay loam.

All varieties of turnips, mangels, beets and carrots came up evenly. The yield was obtained by weighing the roots in two rows 66 feet long and 30 inches apart.

## EXPERIMENTS WITH TURNIPS.

Twenty-one varieties were sown on May 14, and again on May 26. Heavy rains soon after the first seeding delayed the second seeding longer than intended.

The Turnip-fly was troublesome, and did injury to the young plants; but the Turnip Moth, after the plants had been thinned out, destroyed great numbers, and retarded the growth greatly.

The turnips on both sets of plots were taken up on October 9.

### TURNIPS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. 1st Plot. | | Yield per Acre. 1st Plot. | | Yield per Acre. 2nd Plot. | | Yield per Acre. 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Hall's Westbury | 23 | 464 | 774 | 24 | 27 | 1,440 | 924 | .. |
| 2 | Perfection Swede | 22 | 1,936 | 765 | 36 | 29 | 80 | 968 | .. |
| 3 | Jumbo | 22 | 1,540 | 759 | .. | 15 | 360 | 506 | .. |
| 4 | Skirving's | 22 | 1,012 | 750 | 12 | 31 | 832 | 1,047 | 12 |
| 5 | Mammoth Clyde | 21 | 1,956 | 732 | 36 | 16 | 1,000 | 550 | .. |
| 6 | Drummond Purple-top | 21 | 1,956 | 732 | 36 | 18 | 1,752 | 629 | 12 |
| 7 | Selected Purple-top | 20 | 1,580 | 693 | .. | 18 | 488 | 624 | 48 |
| 8 | Carter's Elephant | 20 | 1,316 | 688 | 36 | 21 | 240 | 704 | .. |
| 9 | Shamrock Purple-top | 19 | 1,792 | 663 | 12 | 19 | 1,600 | 660 | .. |
| 10 | Emperor Swede | 19 | 544 | 642 | 24 | 26 | 8 | 866 | 48 |
| 11 | Halewood's Bronze-top | 19 | 148 | 635 | 48 | 26 | 1,328 | 888 | 48 |
| 12 | Bangholm Selected | 18 | 1,884 | 631 | 24 | 21 | 1,032 | 717 | 12 |
| 13 | Imperial Swede | 17 | 980 | 583 | .. | 28 | 288 | 938 | 48 |
| 14 | New Century | 17 | 848 | 580 | 48 | 18 | 960 | 616 | .. |
| 15 | East Lothian | 15 | 96 | 501 | 36 | 24 | 312 | 805 | 12 |
| 16 | Good Luck | 14 | 1,964 | 499 | 24 | 22 | 880 | 748 | .. |
| 17 | Magnum Bonum | 13 | 400 | 440 | .. | 23 | 1,520 | 792 | .. |
| 18 | Elephant's Master | 12 | 948 | 415 | 48 | 23 | 1,520 | 792 | .. |
| 19 | Kangaroo | 10 | 196 | 336 | 36 | 22 | 1,808 | 756 | 48 |
| 20 | Hartley's Bronze | * | | * | | 32 | 152 | 1,069 | 12 |
| 21 | Sutton's Champion | * | | * | | 25 | 952 | 849 | 12 |

* First seeding destroyed by turnip fly.

## EXPERIMENTS WITH MANGELS.

Sixteen varieties of mangels were sown on May 14 and 28 and taken up October 8. From the start all varieties did well.

MANGELS—TEST OF VARIETIES.

| | Name of Variety. | Yield per Acre. 1st Plot. | | Yield per Acre. 1st Plot. | | Yield per Acre. 2nd Plot. | | Yield per Acre. 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Giant Yellow Intermediate | 33 | 1,716 | 1,128 | 36 | 28 | 496 | 941 | 36 |
| 2 | Mammoth Yellow Intermediate | 32 | 812 | 1,080 | 12 | 24 | 840 | 814 | .. |
| 3 | Lion Yellow Intermediate | 32 | 152 | 1,069 | 12 | 17 | 1,704 | 595 | 4 |
| 4 | Giant Yellow Globe | 29 | 1,796 | 996 | 36 | 30 | 720 | 1,012 | .. |
| 5 | Half-long Sugar White | 29 | 1,796 | 996 | 36 | 17 | 1,968 | 597 | 8 |
| 6 | Gate Post | 29 | 1,400 | 990 | .. | 19 | 1,600 | 660 | .. |
| 7 | Yellow Globe Selected | 29 | 80 | 968 | .. | 19 | 608 | 643 | 28 |
| 8 | Prizewinner Yellow Globe | 28 | 1,948 | 965 | 48 | 18 | 1,552 | 025 | 52 |
| 9 | Yellow Intermediate | 28 | 892 | 948 | 12 | 26 | 800 | 880 | .. |
| 10 | Selected Mammoth Long Red | 28 | 496 | 941 | 36 | 26 | 1,064 | 884 | 24 |
| 11 | Half-long Sugar Rosy | 27 | 516 | 908 | 36 | 18 | 1,024 | 617 | 4 |
| 12 | Prize Mammoth Long Red | 26 | 1,592 | 893 | 12 | 25 | 1,480 | 858 | .. |
| 13 | Triumph Yellow Globe | 26 | 800 | 880 | .. | 24 | 576 | 809 | 36 |
| 14 | Mammoth Long Red | 26 | 536 | 875 | 36 | 29 | 1,064 | 994 | 24 |
| 15 | Giant Sugar | 25 | 1,480 | 858 | .. | 24 | 1,104 | 818 | 24 |
| 16 | Leviathan Long Red | 24 | 1,236 | 820 | 36 | 27 | 1,176 | 919 | 36 |

## EXPERIMENTS WITH SUGAR BEETS.

Eight varieties were tested. The first seeding was made May 15, and the second on May 26, and the roots from both were pulled October 9.

SUGAR BEETS.—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. 1st Plot. | | Yield per Acre. 1st Plot. | | Yield per Acre. 2nd Plot. | | Yield per Acre. 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Improved Imperial | 26 | 866 | 881 | 6 | 28 | 1,024 | 950 | 24 |
| 2 | Royal Giant | 26 | 866 | 881 | 6 | 18 | 828 | 613 | 48 |
| 3 | Red Top Sugar | 25 | 1,559 | 859 | 19 | 22 | 1,144 | 752 | 24 |
| 4 | Danish Red Top | 24 | 1,896 | 831 | 36 | 22 | 1,144 | 752 | 24 |
| 5 | Danish Improved | 21 | 1,956 | 732 | 36 | 23 | 1,520 | 792 | .. |
| 6 | French 'Very Rich.' | 21 | 1,243 | 720 | 43 | 14 | 1,700 | 495 | .. |
| 7 | Vilmorin's Improved | 21 | 1,005 | 716 | 45 | 29 | 1,400 | 990 | .. |
| 8 | Wanzleben | 21 | 886 | 714 | 46 | 21 | 1,956 | 732 | 36 |

## EXPERIMENTS WITH CARROTS.

Eleven varieties were tested. The first seeding was made May 2, and the second May 16 and both were pulled October 12. Although the land was fallowed, manured and cultivated the same as for mangels and other roots, the yield in all varieties was small.

CARROTS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. 1st Plot. | | Yield per Acre. 1st Plot. | | Yield per Acre. 2nd Plot. | | Yield per Acre. 2nd Plot. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Half-long Chantenay | 12 | 684 | 411 | 24 | 10 | 1,912 | 365 | 12 |
| 2 | Early Gem | 11 | 1,892 | 398 | 12 | 8 | 1,160 | 286 | .. |
| 3 | Ontario Champion | 10 | 64 | 334 | 24 | 9 | 1,800 | 330 | .. |
| 4 | Improved Short White | 9 | 1,404 | 323 | 24 | 9 | 1,800 | 330 | .. |
| 5 | White Belgian | 9 | 1,140 | 319 | .. | 10 | 1,120 | 352 | .. |
| 6 | Long Yellow Stump-rooted | 9 | 1,140 | 319 | .. | 8 | 1,688 | 294 | 48 |
| 7 | Giant White Vosges | 9 | 1,008 | 316 | 48 | 12 | 1,080 | 418 | .. |
| 8 | New White Intermediate | 9 | 876 | 314 | 36 | 11 | 704 | 378 | 24 |
| 9 | Carter's Orange Giant | 8 | 1,820 | 297 | .. | 9 | 1,800 | 330 | .. |
| 10 | Mammoth White Intermediate | 8 | 500 | 275 | .. | 8 | 1,160 | 286 | .. |
| 11 | Half-long White | 7 | 652 | 244 | 12 | 9 | 1,272 | 321 | 12 |

## EXPERIMENTS WITH POTATOES.

Fifty-five varieties of potatoes were tested this year. The land used was fallowed in 1902. It was clay loam and was manured after frost came, the same as for all roots. The sets were dropped in drills 30 inches apart on May 14, and the crop was dug October 5. The yield per acre was obtained by weighing the potatoes from one row 66 feet long.

All the varieties gave large yields, with few or no small tubers.

POTATOES—TEST OF VARIETIES.

| Number. | Name of Variety. | Character of Growth. | Average Size. | Total Yield per Acre. | | Form and Colour. |
|---|---|---|---|---|---|---|
| | | | | Bush. | Lbs. | |
| 1 | Carman No. 1 | Strong | Large | 711 | 28 | Long, white. |
| 2 | Early Sunrise | " | " | 649 | 52 | " red. |
| 3 | Early St. George | " | " | 631 | 24 | " pink. |
| 4 | Lee's Favourite | " | Medium | 603 | 40 | Oval, red. |
| 5 | Holborn Abundance | " | Large | 597 | 31 | Round, white. |
| 6 | Rose No. 9 | " | Medium | 597 | 31 | Oval, red. |
| 7 | Empire State | " | " | 597 | 31 | " white. |
| 8 | American Wonder | " | Large | 585 | 12 | " " |
| 9 | Canadian Beauty | " | Medium | 585 | 12 | " pink. |
| 10 | Early Andes | " | " | 575 | 57 | " red. |
| 11 | Everett | " | Large | 575 | 57 | Long " |
| 12 | Prolific Rose | " | Medium | 563 | 38 | " pink. |
| 13 | American Giant | " | " | 560 | 33 | Oval, white. |
| 14 | Uncle Sam | " | Large | 554 | 24 | " " |
| 15 | Swiss Snowflake | " | " | 554 | 24 | Round " |
| 16 | Maule's Thoroughbred | " | " | 551 | 19 | Long, red. |
| 17 | Burnaby Seedling | " | " | 548 | 14 | " pink. |
| 18 | Burpee's Extra Early | " | " | 542 | 4 | Oval " |
| 19 | I. X. L. | " | Medium | 542 | 4 | Long " |
| 20 | Rochester Rose | " | Large | 542 | 4 | " red. |

POTATOES—TEST OF VARIETIES—*Concluded.*

| Number. | Name of Variety. | Character of Growth. | Average Size. | Total Yield per Acre. Bush. | Lbs. | Form and Colour. |
|---|---|---|---|---|---|---|
| 21 | Delaware | Strong | Medium | 535 | 55 | Oval, white. |
| 22 | Penn Manor | " | Large | 530 | 50 | Long, red. |
| 23 | Seedling No. 7 | " | Medium | 523 | 36 | Oval " |
| 24 | Country Gentleman | " | Large | 523 | 36 | Long, pink. |
| 25 | Late Puritan | " | Medium | 517 | 26 | " white. |
| 26 | Vanier | " | Large | 514 | 21 | " red. |
| 27 | General Gordon | " | " | 511 | 16 | Oval " |
| 28 | Early Norther | " | " | 508 | 12 | " " |
| 29 | Sharpe's Seedling | " | " | 508 | 12 | Long, pink. |
| 30 | Enormous | " | " | 508 | 12 | " white. |
| 31 | State of Maine | " | " | 508 | 12 | Oval " |
| 32 | McIntyre | " | Medium | 498 | 57 | Long, blue. |
| 33 | Troy Seedling | " | Small | 492 | 48 | Oval, white. |
| 34 | Early Michigan | Medium | Large | 489 | 43 | " " |
| 35 | Early Rose | " | " | 489 | 43 | Long, pink. |
| 36 | Irish Daisy | Strong | Medium | 483 | 33 | Round, white. |
| 37 | Dreer's Standard | " | " | 480 | 28 | Long " |
| 38 | Vick's Extra Early | " | " | 477 | 24 | Oval, pink. |
| 39 | Early White Prize | Medium | " | 468 | 9 | " white. |
| 40 | Sabean's Elephant | Strong | Large | 455 | 50 | " " |
| 41 | Reeve's Rose | " | Medium | 455 | 50 | Long, red. |
| 42 | Early Puritan | Medium | " | 446 | 36 | Oval, white. |
| 43 | Irish Cobbler | Strong | Large | 443 | 31 | " " |
| 44 | Rawdon Rose | " | " | 434 | 16 | " pink. |
| 45 | Cambridge Russet | " | " | 428 | 7 | Long, red. |
| 46 | Carman No. 3 | " | " | 428 | 7 | " white. |
| 47 | Moneymaker | " | " | 403 | 28 | Oval " |
| 48 | Clay Rose | " | " | 391 | 7 | Round, red. |
| 49 | Brown's Rot-proof | " | Medium | 385 | .. | Oval, round. |
| 50 | Green Mountain | " | Large | 369 | 36 | Long, white. |
| 51 | Pingree | Medium | Medium | 357 | 16 | " " |
| 52 | Pearce | " | Large | 357 | 16 | " pink. |
| 53 | Bovee | Strong | Medium | 351 | 7 | Oval " |
| 54 | Early Envoy | Medium | Large | 326 | 28 | Long, red. |
| 55 | Up to Date | Strong | Medium | 267 | 57 | Oval, white. |

## SUMMARY OF CROPS, 1903.

| | Bushels. |
|---|---|
| *Wheat:* | |
| 9 varieties, 26 acres | 931 |
| 10 half acres, rotation test | 98 |
| 62 uniform test plots | 90 |
| | 1,119 |
| *Oats:* | |
| 9 varieties, 36 acres | 3,429 |
| 5 acres Banner, not threshed | 500 |
| 3 acres mixed feed, not threshed (on stubble) | 200 |
| 3 half acres, rotation test | 66 |
| 45 uniform test plots | 254 |
| | 4,449 |
| *Barley:* | |
| 9 varieties, 30 acres | 1,695 |
| 3 acres mixed feed | 100 |
| 3 half acres, rotation test | 34 |
| 35 uniform test plots | 87 |
| | 1,916 |

| | Bushels. |
|---|---|
| *Pease:* | |
| 40 uniform test plots | 95 |
| 1 acre | 40 |
| | 135 |
| Flax | 28 |
| Rye | 6 |
| Speltz | 10 |
| | 44 |

| | Tons. | Lbs. |
|---|---|---|
| Corn, ensilage | 70 | |
| *Hay:* | | |
| Brome grass | 20 | |
| Western Rye grass | 41 | |
| Timothy | 1 | 1,612 |
| Alfalfa | 2 | |
| Cut in coulees, about | 10 | |
| | 144 | 1,612 |

| | Bushels. |
|---|---|
| Roots, about | 2,000 |
| Potatoes | 100 |
| | 2,100 |

## VEGETABLE GARDEN.

The vegetables grown in the past season were not satisfactory in all cases. Beans after they were up were injured by frost, and the growth retarded so much that few varieties ripened. Cucumbers, citrons, melons, pumpkins, squash and tomatoes were as unsatisfactory as the beans, from the same cause. Onions continued growing too long, and had not fully matured when they had to be taken up. Corn produced no ears ready for the table before frost came.

The remainder of the vegetables were good.

### ASPARAGUS.

Barr's Mammoth, Barr's Elmira and Conover's Colossal were in use from May 17 to July 11. Did not do well at first, but after rains came produced a fair crop.

BEANS.—Sown in open, May 11.

| Imported Seed. | In use Green. | Remarks. |
|---|---|---|
| Dwarf Black Speckled | | Killed by frost in June. |
| Emperor of Russia | | " " |
| Dwarf Extra Early | | " " |
| Fame of Vitry | | " " |
| Golden Skinless | | " " |
| Dwarf Inexhaustible | | " " |
| Experimental Farm Seed. | | |
| Haricot, Inexhaustible | Aug. 12 | Frozen before maturity. |
| " Matchless | " 3 | Matured. |
| Black Speckled | " 7 | Frozen before maturity. |
| Golden Skinless | " 7 | " " |
| Emperor of Russia | " 3 | " " |
| Early Six Weeks | July 28 | Matured. |
| Valentine Wax | Aug. 7 | Frozen before maturity. |
| Fame of Vitry | " 7 | " " |
| Dwarf Kidney | July 28 | Matured. |
| Golden Wax | Aug. 3 | " |
| Detroit Wax | " 1 | " |
| Extra Early | July 28 | " |
| Early Mohawk | " 30 | " |
| Currie's Rust-proof | " 31 | " |
| Challenge Black Wax | " 30 | " |

BEETS.

Sown, May 8; in use, August 5; lifted, October 3.
Blood Red Turnip Early, 701 bush. 48 lbs. per acre.
Egyptian Dark Flat Red Early, 810 bush., 42 lbs. per acre.
Nutting's Dwarf Improved Blood Red, 834 bush., 54 lbs. per acre.
Long Smooth Blood Red, 750 bush., 12 lbs. per acre.

BROCOLI.

Sown in hot-house March 30; transplanted, April 13; set out, May 20.
Extra Early White, did not mature.

BRUSSELS SPROUTS.

Dwarf Improved, sown March 30; set out May 20; did not mature.

CELERY.

Sown in hot-house, March 30; transplanted, May 6; set out, June 12; taken up, October 9.

| Name of Variety. | In use. | Weight of Single Plants. |
|---|---|---|
| | | Lbs. |
| Rose-ribbed Paris | Oct. 1 | 1¾ |
| Paris Golden Yellow | Sept. 5 | 1¾ |
| Red Large-ribbed | Oct. 1 | 2½ |
| Giant Pascal | " 9 | 2¾ |

All varieties did well and produced an excellent crop.

### CAULIFLOWER.

Sown in hot-house March 30; transplanted, May 13; set out, May 20.
Half Early Paris.—In use July 8; average weight, 5 lbs.
Extra Early Snowball.—In use June 30; average weight, 6 lbs.
Extra Early Dwarf Erfurt.—In use July 10; average weight, 5 lbs.

### CARROTS.

Sown, April 22; lifted, October 8.

| Name of Variety. | In use. | Yield per Acre. | |
|---|---|---|---|
| | | Bush. | Lbs. |
| Parisian Forcing Red | Aug. 5 | 290 | 24 |
| Half-long Luc Stump-rooted | " 5 | 302 | 30 |
| French Horn | " 5 | 265 | 12 |
| Long Blood Red | " 5 | 314 | 36 |

Of fair size except French Horn carrots, which were very small.

### CABBAGE.

Sown in hot-house, March 30; transplanted to frame, April 13; set out, May 20; taken up, October 13.

| Name of Variety. | In use. | Average Weight. | Remarks. |
|---|---|---|---|
| | | Lbs. | |
| Extra Early Express | July 14 | 8 | Good, solid heads. |
| " Midsummer Savory | Aug. 13 | 6 | " heads. |
| Winningstadt Early | " 6 | 10 | " solid heads. |
| Early Jersey Wakefield | July 28 | 9 | Did well. |
| Paris Market | " 18 | 8 | " |
| Fottler's Improved Brunswick | " 18 | 16 | Very large heads. |
| Green Globe Savoy | " 18 | 10 | Good heads. |
| Red Large Drumhead | " 18 | 12 | " |

### GARDEN CORN.

Planted May 12. None ready for use before frost came.

Varieties Planted.—Crosby's Early Sweet; the Cory, in use September 12; Mitchell's Extra Early; Ringleader; Early White Cory, in use September 12; Squaw (Indian Head seed), very little germinated; Extra Early Premo. Pop-corn, White Pearl and Amber Rice, did not ripen.

### CUCUMBERS.

Planted in hot-house, April 14; set out, May 28; sown in open, May 13; all frozen, September 5.

Varieties Sown.—Cool and Crisp, Everbearing, Improved White Spine.

### CITRONS.

Sown in hot-house, April 14; set out, May 28; sown in open, May 13.
Preserving.—Green fruit, July 20; frozen, September 5.

### LETTUCE.

Sown, May 17 and June 6.

| Name of Variety. | First Seeding. In use | Second Sown. | Second Seeding. In use | Remarks. |
|---|---|---|---|---|
| Green Paris Cos | July 10 | June 6 | Aug. 10 | Very fine large heads. |
| White Self-folding Cos | " 10 | " 6 | " 10 | " " |
| Blonde Stone-head | June 24 | | | Good heads. |
| Wheeler's Tom Thumb | " 24 | | | " |
| Trocadero Red-edged | " 24 | | | " |
| Early Ohio | " 24 | June 6 | July 28 | " |
| All the Year Round | " 24 | " 6 | " 28 | " |
| Red-edged Victoria | " 24 | | | " |
| Neapolitan | " 30 | June 6 | Aug. 3 | " |

### ONIONS.

Sown in hot-house, March 30; set out, May 28; lifted, September 24. Sown in open, April 22; lifted, September 24. Were not fully matured when taken up.

| Name of Variety. | Yield per Acre, Sown in hot-house. | | Yield per Acre. Sown in open. | |
|---|---|---|---|---|
| | Bush. | Lbs. | Bush. | Lbs. |
| Market Favorite | 217 | 48 | 217 | 40 |
| Trebon's Large Yellow | 230 | 24 | 193 | 36 |
| Danver's Yellow Globe | 242 | .. | 290 | 24 |
| Large Red Wethersfield | 266 | 12 | 242 | .. |
| Paris Silverskin | ... | .. | 193 | 36 |

### MELONS.

Sown in hot-house, April 14; set out, May 28; sown in open, May 13; frozen, September 5.

Musk Melons.—Earliest Ripe and Long Island, did not mature.

Water Melon.—Fourth of July did not mature.

### PUMPKINS.

Sown in hot-house, April 28; set out, May 28; sown in open, May 13.

Large Yellow Field, New Japanese Pie and Sweet or Sugar did not mature; frozen, September 5.

### SQUASH.

Sown in open, May 13.

White Bush Scalloped and Giant Crookneck did not mature; frozen, September 5.

### TURNIPS.

Sown, May 13; in use, August 10; lifted, October 8.

| Name of Variety. | Weight of Largest. | Yield per Acre. | |
|---|---|---|---|
| | Lbs. | Bush. | Lbs. |
| Extra Early White Milan | 14 | 738 | .. |
| Early White Flat Strap-leaved | 10 | 586 | 54 |
| Robertson's Golden Ball | 7 | 665 | 30 |
| Early Stone | 8 | 689 | 42 |

### PEASE.

Sown, May 14.

| Name of Variety. | In use Green. | Ripe. | Size. | Remarks. |
|---|---|---|---|---|
| Surprise | July 21 | Sept. 1 | Large | Good crop, early. |
| Stratagem | Aug. 7 | " 1 | " | " |
| Shropshire Hero | " 7 | " 10 | " | " |
| C. P. R. | July 26 | " 2 | " | " |
| Alaska | " 18 | Aug. 28 | Small | " " |
| Admiral | " 28 | Sept. 10 | " | Extra good crop. |
| Anticipation | " 28 | " 9 | Large | Good crop. |
| American Wonder | " 20 | " 1 | Medium | Fair crop, early. |
| Burpee's Profusion | Aug. 1 | " 10 | " | Good crop. |
| Extra Early | July 18 | Aug. 28 | Small | Heavy crop, early. |
| Everbearing | Aug. 7 | Sept. 1 | Large | Good crop, early. |
| First of All | July 18 | Aug. 28 | Medium | " " |
| First and Best | " 18 | " 28 | Small | Excellent crop, early. |
| Champion of England | Aug. 7 | Sept. 10 | Large | Good crop. |
| Horsford's Market Garden | July 20 | Aug. 28 | Medium | " early. |
| Wm. Hurst | " 25 | Sept. 9 | Small | " |
| Gradus | " 18 | Aug. 28 | Large | " " |
| Laxton's Charmer | Aug. 3 | Sept. 1 | Medium | " |
| Rural New Yorker | July 27 | Aug. 30 | " | " |
| Premium Gem | Aug. 1 | Sept. 9 | " | " |
| Yorkshire Hero | " 7 | " 10 | Large | " |
| Harrison's Glory | " 7 | " 10 | " | " |
| Nott's Excelsior | July 22 | " 8 | Medium | " " |
| Queen | Aug. 7 | Aug. 30 | " | " |
| Daisy | " 7 | Sept. 10 | Large | " |

### RADISH.

Sown, May 8; in use, June 20. Second seeding, June 1; in use, July 2.

Early Scarlet Turnip, Forcing Scarlet Turnip, Forcing Deep Scarlet Extra Early, Early Deep Scarlet, French Breakfast, Scarlet White-tipped, Olive-shaped Scarlet.

Winter.—Scarlet China, Black Spanish.

All varieties did well in both seedings.

### PARSNIPS.

Sown, May 8; ready for use, September 25; lifted, October 8.

| Name of Variety. | Yield per Acre. | | Remarks. |
|---|---|---|---|
| | Bush. | Lbs. | |
| Improved Hollow Crown | 338 | 48 | Did well, some fine roots. |
| The Student | 447 | 42 | " " " |

### TOMATOES.

Sown in hot-house March 30; transplanted to cold frame April 14; set out May 21.

| Name of Variety. | In Use Green. | First Ripe. | Remarks. |
|---|---|---|---|
| The Ruby | July 20 | Sept. 15 | |
| Earliana | " 20 | " 5 | |
| Dominion Day | " 22 | | Did not ripen. |
| Earliest of All | " 18 | Sept. 7 | |
| New Earliana | " 24 | | " |

### PARSLEY.

Sown May 8; Champion Moss-curled; did well.

### RHUBARB.

Old beds : Victoria, good crop; Linnaeus, good crop.

Seed sown in cold frame April 24; set out July 10; Victoria or Giant, Myatt's Linnaeus.

Roots from Experimental Farm, Brandon. Set out May 9:—

Early Prince.
Victoria.
Monarch Seedling.
Scarlet Nonpareil.
Royal Linnaeus.
Magnum Bonum.
Early Crimson.
General Taylor.
Fottler's Improved.
Prince Albert.
Paragon.
Brabant's Colossal.
Royal Albert.
Prince of Wales.
Strawberry.
Early Scarlet.
Salt's Perfection.
Tobolsk.

All varieties did well. There were some very fine stalks, some of which seeded.

### COMMON SAGE.

Sown May 8; did well.

### SUMMER SAVORY.

Sown May 8; did well.

### SPINACH.

Large Round Viroflay; sown May 8; in use June 26; good crop.

## THE FLOWER GARDEN.

The flower garden was extra good the past season. Pansies were never so fine, and continued in bloom up to November.

ANNUALS.—Propagated in hot-house. Sown March 23.

| Variety. | Set out. | Bloom. |  | Remarks. |
|---|---|---|---|---|
|  |  | From | To |  |
| Abronia Umbellata | June 4 | Aug. 5 | Sept. 5 | Very fine. |
| Ageratum, Dwarf Imperial Blue | " 4 | " 5 | " 5 | Good border flower. |
| Agrostemma, Coeli Rosa dwarf | " 4 | July 15 | " 5 | Did well. |
| Amarantus Superbus | " 4 | " 30 | " 5 | Fine plants. |
| Alyssum Benthami | May 28 | " 15 | " 5 | Did well. |
| Antirrhinum, 3 varieties | " 26 | " 20 | " 5 | Very fine. |
| Adonis Autumnalis | " 26 | " 26 | " 5 | Small deep red flower. |
| Asters, 15 varieties | " 26 | " 20 | " 16 | Did well. Fine blooms. |
| Bartonia Aurea | June 4 | " — | .......... | Did not germinate. |
| Brachycome iberidifolia | " 4 | June 20 | Sept. 5 | Did well. |
| Candytuft | May 26 | " 20 | " 5 | Made good show. |
| Calendula, Royal Marigold | " 26 | " 15 | " 16 | " " |
| Chrysanthemum, Tricolor | " 26 | " 25 | " 16 | Good show. |
| " Coronarium | " 26 | July 1 | " 16 | " |
| Clarkia, 2 varieties | " 26 | June 23 | " 5 | " |
| Centaurea Margarita | " 26 | " 6 | " 5 | " |
| Coreopsis Drummondii | " 26 | " 11 | " 5 | " |
| " tinctoria | " 26 | " 15 | " 5 | " |
| Celosia, 3 varieties | " 26 | " 25 | " 5 | " |
| Dianthus, 7 varieties | " 27 | July 6 | " 16 | Some extra fine blooms. |
| Daisy, double mixed | June 4 | " 1 | " 5 | Bloomed well. |
| Gypsophila viscosa | May 26 | June 20 | " 5 | Did well. |
| Godetia, 4 varieties | " 26 | Aug. 5 | " 5 | Did well. Good show. |
| Gaillardia picta, 2 varieties | " 26 | July 11 | " 16 | Very fine. |
| Helianthus, 2 varieties | " 27 | " 25 | " 5 | Did well. |
| Hollyhock, 2 varieties | " 27 | " 28 | " 5 | Some fine plants. |
| Helichrysum, double dwarf | " 27 | " 10 | " 5 | Fine flowers. |
| Iberis Gibraltarica | " 28 | " — | .......... | Did not bloom. |
| Impatiens Balsamina, double | " 27 | " — | Sept. 5 | Frozen June 10. |
| Linum Grandiflorum | " 28 | June 20 | " 5 | Some fine blooms. |
| Lupins, 5 varieties | " 28 | " 20 | " 16 | All did well. |
| Larkspur, 4 varieties | " 28 | " 24 | " 5 | " |
| Mignonette | " 28 | " 10 | " 5 | Did well. |
| Nasturtium, 3 varieties | 28 | July 6 | " 5 | " |
| Nicotiana, 2 varieties | June 2 | " 1 | " 5 | " |
| Portulaca, double | May 28 | June 26 | " 5 | " |
| Petunia, 5 varieties | " 26 | " 24 | " 16 | Fine blooms. |
| Lobelia, Crystal Palace | " 27 | " 15 | " 5 | Good border flower. |
| Phlox, 4 varieties | " 28 | " 15 | " 16 | Splendid show of colours. |
| Pansies, 8 varieties | " 26 | " 10 | Nov. 6 | Good show till November. |
| Poppies, 9 varieties | June 4 | " 10 | Sept. 5 | Fine show. |
| Salpiglossis, 2 varieties | May 28 | " 26 | " 5 | Extra fine. |
| Scabiosa, 3 varieties | " 28 | July 15 | " 5 | Very good show. |
| Stocks, 3 varieties | " 26 | June 16 | " 16 | " " |
| Tagetes signata pumila | " 28 | " 8 | " 5 | Good border flower. |
| Verbena, 2 varieties | " 26 | " 24 | " 5 | Very fine blooms. |
| Zinnia, 3 varieties | " 26 | " 8 | " 5 | Did well. |

### ANNUALS.—Sown in the open.

The following annuals were sown in the open on May 9, except Sweet Pease, which were sown April 16, and May 10. All varieties bloomed freely, but were from two to four weeks later than the same varieties sown in the hot-house and transplanted.

Abronia umbellata.
Asters.
Ageratum.
Antirrhinum.
Calendula.
Coreopsis.
Centaurea.
Candytuft.
Chrysanthemum.
Clarkia.
Dianthus.
Eschscholtzia.
Gaillardia.
Godetia.
Mignonette.
Nasturtium.
Phlox Drummondii.
Poppies.
Salpiglossis.
Stocks.
Scabiosa.
Sweet Pease, 33 varieties.
Verbena.
Zinnia.

### PERENNIALS.

The old beds of perennial flowers wintered well and flowered freely during the summer.

### BULBS.

*Dahlias.*—Set out May 26. In flower July 29. Late on account of being injured by frost in June.

*Gladioli.*—Set out May 26. In flower August 10. Only a few bloomed.

*Tulips.*—Bloomed May 12. Were short, but fine blooms.

*Cannas.*—Bulbs rotted.

*Iris.*—Planted 1900. Bloomed freely from June 7 to end of July.

### PÆONIES.

Planted in 1900. Flowered well, but were a good deal beaten down by heavy rains as buds were opening.

Following will be found a list of the perennial flowers that were living at the end of the past season. The majority of these were sent up from the Central Experimental Farm in 1900, and have proved sufficiently hardy for this climate.

### IRIS.

Amœna Crebillon.
    “ Julia Grisie.
    “ Maria Theresa.
    “ Mrs. H. Darwin.
Balkana.
Blondovi.
Chamæriris.
Ensata.
    “ Biglumis.
    “ Oxypetala.
Flavescens.
Furcata.
Germanica.
Germanica Verschuur.
Gigantea.
Hungarica.
Neglecta Arlequin Milanais.
    “ Hericartiana.
Nudicaulis.
Orientalis.
Plicata Gisela.
Prismatica.
Pumila.
    “ Gracilis.
    “ Lutea.
Regina.

### IRIS—*Concluded.*

Ruthenica.
Sibirica.
“ Constantinopolitana.
“ Furcata.
“ Hæmatophylla.
“ Light Blue.
“ Lutea.
“ Maritima.
“ Tenuifolia.
Squalens.
“ Bronze Stoffel.
“ Hector.
“ Lady Seymour.
Squalens La Marmora.
“ La Tristesse.
“ Minerva.
“ Tarquin.
Variegata.
“ Arquinto.
“ Henry Havard.
“ Honorabile.
“ pancrace.
“ Minos.
“ Samson.
Virescens.

### PÆONIES.

Pæonia Sinensis—
Souvenir de l'Exposition.
Albiflora Thorbecki.
Festiva.
Prosper d'Aremburg.
Thorbecki.
Officinalis Mutabilis.
De Candolle.
Festiva Maxima.
Rubra plenissima.
Rubicunda Alba Marg.
Duchesse d'Orleans.
Ambroise Verschaffelt.
L'Eclatante.
Tenuifolia fl. pl.

### SUNDRY PERENNIALS.

Ajuga genevensis.
Acorus spurius.
Achillea millefolium rubrum.
“ ptarmica fl. pl.
Aster Novæ Angliæ roseus.
“ Top Sawyer.
Aconitum napellus.
Artemisia stellarianum.
Boltonia latisquama.
Campanula macrantha.
Centaurea macrocephala.
“ montana alba.
Clematis recta.
Dictamnus fraxinella.
Delphinium.
Dahlia.
Erigeron macranthus.
Funkia lancifolia.
Grass Pink.
Gladiolus.
Hyacinthus candicans.
Helianthus Maximiliana.
Hemerocallis Kwanso fl. pl.
“ Middendorfii.
“ fulva.
“ disticha fl. pl.
“ graminæfolia.
Hemerocallis Dumortieri.
Lupinus.
“ Pres. Cleveland.
“ polyphyllus.
Lychnis Hybrid.
Lysimachia nummularifolia.
Phalaris arundinacea, fol. var.
Pyrethrum uliginosum.
Rose, Queen of the Prairie.
“ Persian Yellow.
“ Sweet Briar.
Rosa rugosa alba.
Double Rose.
Rosa Cinnamonea.
“ Rugosa.
“ Baronne Prevost.
Hyb. P. Rose Clara Cochet.
Rosa Acicularis.
“ Lucida.
“ Nutkana.
“ macrantha.
Rudbeckia Golden glow.
“ Laciniata.
Solidago rigida.
“ gigantea.
Spiraea Ulmaria.
“ filipendula.

SUNDRY PERENNIALS—*Concluded.*

Sidalcea candida.
Symphytum asperrimum.
Thermopsis fabacea.
Veronica elegans carnea.
Veronica spicata.
" salurgoides.
" Virginica.
Viola pedata.

## TREES AND SHRUBS.

The trees and shrubs on this farm made rapid growth during the past season. The frequent rains in August and September extended the growing period longer than usual.

Very few seeds formed on the ash-leaved Maple trees, but Caragana, Honeysuckle and other shrubs seeded very heavily.

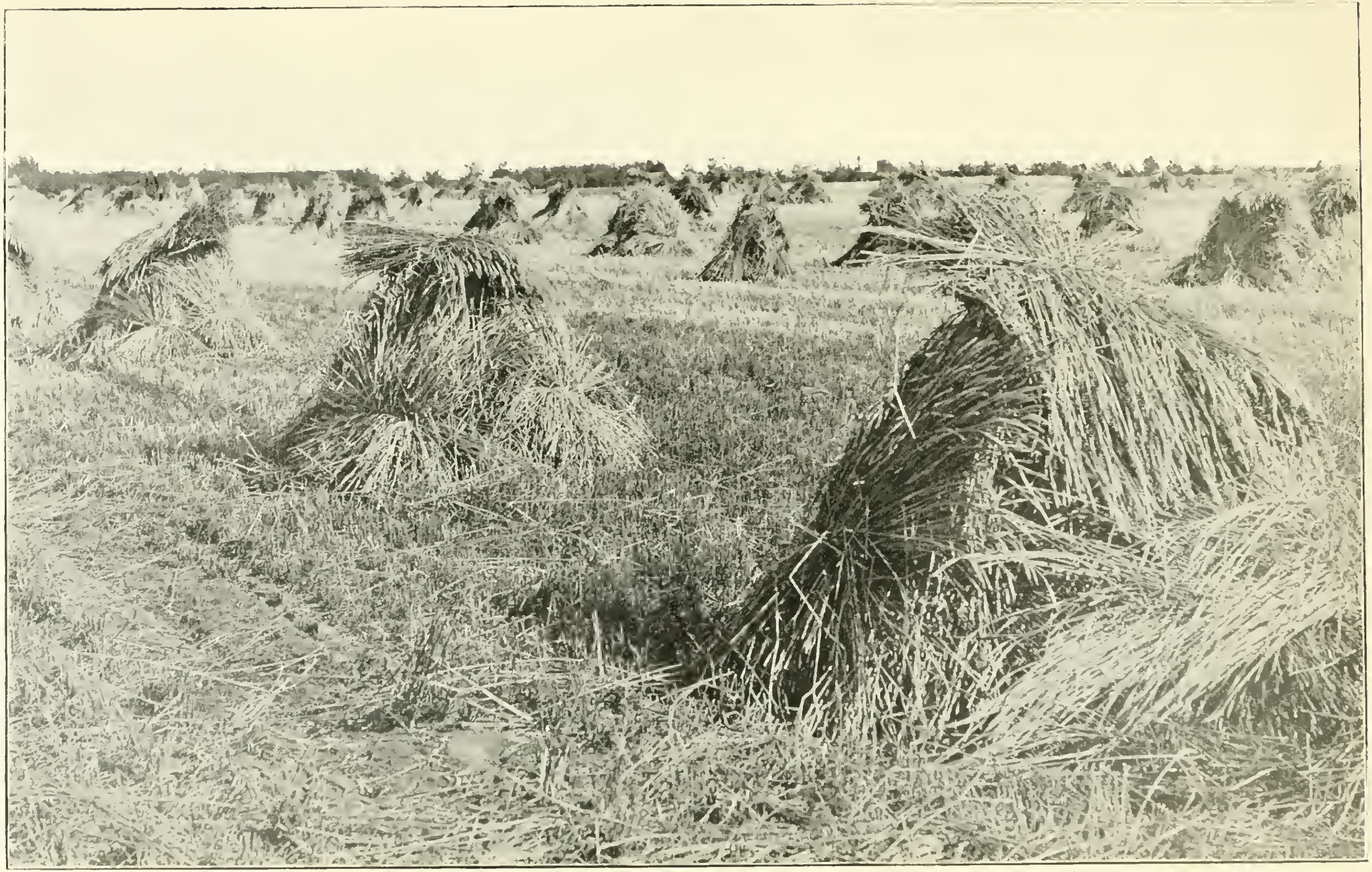
108,000 seedling maple and a large number of Cottonwood trees, Caragana and other shrubs were taken up this fall for next year's distribution.

The following trees and shrubs have done the best on the Indian Head Farm, and can be recommended for cultivation throughout the Territories:—

| *Botanical Name—* | *Common Name—* |
|---|---|
| Acer Negundo. | Box Elder. |
| Acer Tataricum Ginnala. | Ginnalian Maple. |
| Alnus glutinosa. | Common Alder. |
| Betula populifolia. | White Birch. |
| Caragana arborescens. | Siberian Pea Tree. |
| Cornus stolonifera. | Red Osier Dogwood. |
| Cotoneaster integerrima. | Common Cotoneaster. |
| Crataegus chlorosarca. | |
| " coccinea. | Scarlet Haw. |
| " Crus galli. | Cockspur Thorn. |
| Fraxinus americana. | White Ash. |
| " pennsylvanica lanceolata | Green Ash. |
| Lonicera Alberti. | Albert Regel's Honeysuckle. |
| " tatarica. | Tartarian Honeysuckle. |
| Populus balsamifera. | Balsam Poplar. |
| " deltoidea. | Cottonwood. |
| Rhamnus cathartica. | Common Buckthorn. |
| Rhamnus frangula. | Breaking Buckthorn. |
| Ribes aureum. | Missouri Currant. |
| " Sibirica. | Siberian Currant. |
| Salix pentandra. | Laurel-leaved Willow. |
| " purpurea pendula. | Pendulous Purple Willow. |
| " Voronesh. | Voronesh Willow. |
| Syringa chinensis. | Rouen Lilac. |
| " Josikea. | Josika's Lilac. |
| " vulgaris. | Common Lilac. |
| Ulmus americanus. | American Elm. |
| Viburnum Opulus. | Highbush Cranberry. |

### ARBORETUM.

The Arboretum was very attractive during the past season, and proved of interest to visitors at all times from the early spring till late in the fall. On account of the abundant rains, everything made extra strong growth.



(Photo. by C. E. Saunders.)

Crop of Red Fife in Stook at Indian Head.

A list is appended of the species and varieties under observation at present, giving the date planted and particulars as to hardiness. Those which have come through one or more winters without injury, or with very slight injury to the tips only, are marked hardy; where the new wood has been killed back to one-half its growth, the variety has been marked half hardy; and those which have had their wood killed to the ground by winter, have been noted as tender.

No additions were made to the Arboretum last spring.

| Botanical Name. | Common Name. | Planted. | Remarks. |
|---|---|---|---|
| Acanthopanax sessiliflorum | | 1900 | Nearly hardy. |
| Acer dasycarpum | White maple | 1896 | Half hardy. |
| " Negundo | Box elder | 1895 | Hardy. |
| " platanoides | Norway maple | 1896 | Half hardy. |
| " saccharinum | Rock or sugar maple | 1899 | " |
| " " Minn. seed No. 1 | | 1897 | " |
| " tataricum | Tartarian maple | 1902 | Hardy. |
| " " ginnala | Ginnalian maple | 1895 | " |
| Alnus glutinosa | Common alder | 1896 | " |
| " " imperialis | Imperial cut-leaved alder | 1899 | Tender. |
| " viridis | Green alder | 1896 | " |
| Amelanchier alnifolia | Alder-leaved June-berry | 1902 | Hardy. |
| Amorpha canescens | Lead plant | 1900 | Half hardy. |
| " fruticosa | | 1902 | Tender. |
| Artemisia abrotanum | Old man | 1895 | Half hardy. |
| " " tobolskianum | Siberian Southernwood | 1895 | " |
| Berberis amurensis | Amur barberry | 1899 | Hardy. |
| " aristata | | 1896 | Half hardy. |
| " asiatica | | 1902 | " |
| " canadensis | | 1902 | " |
| " cerasina | | 1896 | Hardy. |
| " cretica | Cretan barberry | 1899 | Nearly hardy. |
| " Fischeri | | 1896 | Half hardy. |
| " hybrid No. 2 | | 1899 | Hardy. |
| " ilicifolia | Holly-leaved barberry | 1896 | Half hardy. |
| " Sieboldii | Siebold's " | 1898 | " |
| " sinensis | Chinese " | 1896 | " |
| " Thunbergii | Thunberg's " | 1897 | " |
| " vulgaris iberica | | 1899 | Nearly hardy. |
| " " japonica | | 1899 | Half hardy. |
| " " foliis purpureis | | 1896 | Tender. |
| " " violacea | | 1897 | Nearly hardy. |
| Betula alba | European white birch | 1895 | Hardy. |
| " " fastigiata | | 1899 | Tender. |
| " " laciniata pendula | Cut-leaved birch | 1899 | Hardy. |
| " " pendula Youngii | Young's weeping birch | 1900 | Half hardy. |
| " " purpurea | | 1902 | " |
| " davurica | | 1896 | Hardy. |
| " (from Niemetz) | | 1898 | Half hardy. |
| " lenta | Sweet birch | 1899 | Nearly hardy. |
| " lutea | Yellow birch | 1899 | Half hardy. |
| " papyrifera | Paper birch | 1896 | Nearly hardy. |
| " populifolia | White birch | 1899 | Half hardy. |
| " pumila | Low birch | 1899 | Hardy. |
| Caragana arborescens | Siberian Pea-tree | 1895 | " |
| " Chamlagu | | 1900 | " |
| " frutescens | Woody caragana | 1895 | " |
| " " mollis glabra | | 1896 | " |
| " grandiflora | Large-flowered caragana | 1896 | " |
| " microphylla | | 1901 | " |
| " pygmaea | Dwarf caragana | 1896 | " |
| " " aurantiaca | | 1900 | " |
| " Redowskii | | 1895 | " |
| Celastrus scandens | Climbing bitter-sweet | 1898 | Half hardy. |
| Celtis occidentalis | Hackberry | 1901 | " |
| Clematis Flammula | Sweet-scented Virgin's bower | 1898 | " |
| " ligusticifolia | | 1898 | Hardy. |
| " recta | | 1898 | Half hardy. |
| " Viticella | | 1901 | " |

| Botanical Name. | Common Name. | Planted. | Remarks. |
|---|---|---|---|
| Cornus alba sibirica | Siberian dogwood | 1897 | Hardy. |
| " " " variegata | Variegated " | 1897 | Nearly hardy. |
| " " " Spaethi | Spath's " | 1899 | Tender. |
| " Baileyi | | 1899 | Hardy. |
| " sanguinea | | 1897 | " |
| " stolonifera | | 1896 | " |
| Cotoneaster acutifolia | | 1899 | " |
| " integerrima | Common Cotoneaster | 1896 | " |
| " laxiflora | | 1899 | " |
| " No. 10 Niemetz | | 1898 | " |
| Crataegus chlorosarca | | 1896 | " |
| " coccinea | Scarlet haw | 1896 | " |
| " Crus-galli | Cockspur thorn | 1896 | " |
| " Douglasii | | 1902 | Tender. |
| " nigra | | 1900 | " |
| " No. 9 Niemetz | | 1898 | " |
| " oxyacantha Sibirica | | 1897 | " |
| " sanguinea | | 1897 | " |
| Cytisus biflorus | | 1899 | " |
| " capitatus | | 1899 | Hardy. |
| " nigricans | | 1899 | Half hardy. |
| " " longispicatus | | 1898 | Tender. |
| " purpureus | | 1902 | " |
| " sessilifolius | | 1896 | Half hardy. |
| " triflorus | | 1902 | Tender. |
| Diervilla lutea | | 1902 | Half hardy. |
| Elaeagnus angustifolia | Russian olive | 1895 | Nearly hardy. |
| " argentea | Wolf willow | 1895 | Hardy. |
| " macrophylla | | 1895 | " |
| Euonymus atropurpureus | Burning bush | 1896 | Half hardy. |
| " europaeus | Common spindle-tree | 1896 | " |
| " linearis | | 1902 | Hardy. |
| Fraxinus americana | White ash | 1896 | Nearly hardy. |
| " berlandieriana | Berlandier ash | 1897 | Tender. |
| " nigra | Black ash | 1899 | Hardy. |
| " pennsylvanica | Red ash | 1895 | " |
| " quadrangulata | Blue ash | 1897 | Tender. |
| Genista tinctoria sibirica | | 1899 | " |
| Hydrangea paniculata | | 1896 | Tender. |
| " hortensis | | 1899 | " |
| Juglans cinerea | Butternut | 1898 | " |
| Laburnum alpinum | | 1898 | " |
| Ligustrum amurensis | Amur privet | 1899 | Half hardy. |
| " vulg. fol. aureis var. | | 1899 | Tender. |
| Lonicera Alberti | Albert Regel's honeysuckle | 1896 | Hardy. |
| " bella atrorosea | | 1902 | " |
| " flava | | 1899 | " |
| " gracilipes | | 1899 | " |
| " hirsuta | Hairy honeysuckle | 1899 | " |
| " Morrowi | | 1902 | " |
| " notha carnea | | 1902 | Tender. |
| " " gilva | | 1902 | Hardy. |
| " punicea | | 1899 | Tender. |
| " regeliana | | 1901 | " |
| " ruprechtiana | | 1901 | Hardy. |
| " Sullivantii | | 1901 | Tender. |
| " tatarica | Tartarian honeysuckle | 1896 | Hardy. |
| " " alba rosea | | 1902 | " |
| " " elegans | | 1899 | " |
| " " grandiflora rubra | | 1899 | " |
| " " splendens | | 1902 | " |
| " Xylosteum | | 1899 | Half hardy. |
| Lycium europeum | | 1902 | Tender. |
| " chinense | | 1902 | Half hardy. |
| Neillia opulifolia | Ninebark | 1900 | Nearly hardy. |
| Ostrya virginica | Ironwood | 1899 | Hardy. |
| Philadelphus deutziæflorus | | 1896 | Half hardy. |
| " grandiflorus | | 1896 | " |
| " hyb. Lem. Boule d'Argent | | 1899 | Tender. |
| " Keteleerii flore pleno | | 1900 | " |
| Photinia variabilis arguta | | 1899 | " |

| Botanical name. | Common name. | Planted. | Remarks. |
|---|---|---|---|
| Populus alba nivea | | 1896 | Hardy. |
| " " " pyramidalis | Pyramidal Silver poplar | 1896 | Nearly hardy. |
| " balsamifera | Balsam poplar | 1895 | Hardy. |
| " berolinensis | | 1895 | " |
| " certinensis | | 1896 | " |
| " deltoidea | Cottonwood | 1895 | " |
| " nigra | Black poplar | 1898 | " |
| " " Nolestii | | 1896 | " |
| " petrowskyana | | 1896 | " |
| " sibirica | | 1895 | " |
| " suaveolens | | 1898 | " |
| " tremuloides | White poplar | 1895 | " |
| " Wobstii | | 1896 | " |
| Potentilla fruticosa | Shrubby Cinque-foil | 1899 | " |
| Prunus Besseyi | | 1902 | Half hardy. |
| " demissa | Western wild cherry | 1895 | Hardy. |
| " grayana, Maxim | | 1896 | " |
| " Maackii | | 1896 | " |
| " Maximowiczii | | 1899 | " |
| " pennsylvanica | | 1895 | " |
| " pumila | Sand cherry | 1895 | " |
| " " (Seedling of Wonder) | | 1901 | Half hardy. |
| " serotina | Wild black cherry | 1899 | " |
| " tomentosa | | 1902 | Tender. |
| " utahensis | | 1902 | Hardy. |
| Pyrus americana | American mountain ash | 1896 | " |
| " aria flabelliformis | | 1897 | " |
| " aucuparia | European mountain ash | 1896 | Half hardy. |
| " baccata | Siberian crab apple | 1896 | Hardy. |
| " betulæfolia | | 1902 | Half hardy. |
| " Maulei | Maule's Japanese quince | 1899 | " |
| " nigra salicifolia | | 1900 | Tender. |
| " rotundifolia | | 1900 | " |
| " spuria | | 1896 | Hardy. |
| " sinensis | | 1902 | Tender. |
| Quercus coccinea | Scarlet oak | 1899 | Half hardy. |
| " (Japanese) | | 1899 | " |
| " macrocarpa | Mossy-cup oak | 1895 | Hardy. |
| " pedunculata fastigiata | | 1902 | Tender. |
| Rhamnus cathartica | Common buckthorn | 1896 | Hardy. |
| " crenata | | 1900 | Tender. |
| " davurica | | 1899 | Hardy. |
| " Frangula | Breaking buckthorn | 1896 | Nearly hardy. |
| " No. 13 Niemetz | | 1898 | Hardy. |
| Rhus glabra | Smooth sumach | 1896 | Nearly hardy. |
| Ribes alpinum | Mountain currant | 1899 | Tender. |
| " " pumilum | | 1899 | Hardy. |
| " aureum | Missouri currant | 1899 | " |
| " " tenuiflorum | | 1901 | Nearly hardy. |
| " (Cypress Hills) | | 1900 | Hardy. |
| " robustum | | 1899 | Tender. |
| " saxatile | | 1899 | Hardy. |
| " sibirica | | 1898 | " |
| Rosa blanda | Smooth rose | 1898 | " |
| " californica | | 1899 | Half hardy. |
| " cinnamomea | | 1902 | Hardy. |
| " ferruginea | Purple-leaved rose | 1895 | Half hardy. |
| " rubiginosa | | 1899 | " |
| " rugosa | Japanese rose | 1896 | Hardy. |
| " lucida grandiflora | | 1902 | " |
| " villosa pomifera | | 1898 | Nearly hardy. |
| Rubus balfourianus | | 1900 | Hardy. |
| " caesius | | 1900 | " |
| Salix alba argentea | Silver-leaved willow | 1897 | Half hardy. |
| " " britzensis | | 1896 | Hardy. |
| Salix aurea pendula | | 1896 | Nearly hardy. |
| " Bataviae | | 1898 | " |
| " Caprea | Goat willow | 1897 | Half hardy. |
| " daphnoides | Violet willow | 1895 | Hardy. |
| " longifolia argyrophylla | | 1898 | Half hardy. |

| Botanical name. | Common name. | Planted. | Remarks. |
|---|---|---|---|
| Salix Nicholsoni purpurascens | | 1898 | Nearly hardy. |
| " nigricans | Dark broad-leaved willow | 1898 | " |
| " pentandra | Laurel-leaved willow | 1896 | Hardy. |
| " purpurea pendula | | 1896 | " |
| " rubra forbyana | | 1896 | Half hardy. |
| " Salamoni | | 1898 | " |
| " triandra | | 1897 | " |
| " Voronesh | | 1895 | Hardy. |
| Sambucus (Blue-fruited from B.C.) | | 1899 | Tender. |
| " canadensis | Common elder | 1896 | Nearly hardy. |
| " nigra | | 1902 | Tender. |
| " " aurea nova | | 1896 | " |
| " " foliis aureis | | 1896 | " |
| " " heterophylla | | 1896 | " |
| " " Swindonensis | | 1899 | " |
| " " virescens | | 1899 | " |
| " No. 45 Niemetz | | 1898 | " |
| Shepherdia argentea | Buffalo berry | 1895 | Hardy. |
| Spiraea arguta | | 1896 | " |
| " chamaedrifolia | | 1896 | " |
| " discolor | White-beam leaved spiraea | 1899 | Half hardy. |
| " japonica | Japanese spiraea | 1899 | Tender. |
| " " alba | | 1899 | Half hardy. |
| " " bumalda | | 1899 | Tender. |
| " " superba | | 1896 | " |
| " media | | 1899 | " |
| " salicifolia | Common Meadow-sweet | 1899 | Hardy. |
| " sorbifolia | Sorbus-leaved spiraea | 1898 | Nearly hardy. |
| " tomentosa | Hard-hack | 1898 | Tender. |
| " Van Houttei | Van Houtte's spiraea | 1895 | Half hardy. |
| Symphoricarpus Heyeri | | 1900 | Hardy. |
| " racemosus | Snow-berry | 1895 | " |
| Syringa chinensis | Rouen lilac | 1896 | " |
| " Emodi | | 1901 | " |
| " Josikea | Josika's lilac | 1895 | Half hardy. |
| " pekinensis | Pekin lilac | 1899 | " |
| " villosa | | 1895 | Hardy. |
| " vulgaris | Common lilac | 1895 | " |
| " " Abel Carriere | | 1901 | " |
| " " alba | White lilac | 1899 | " |
| " " alba grandiflora | | 1899 | " |
| " " Alphonse Lavallée | | 1901 | " |
| " " Charles Joly | | 1901 | " |
| " " Charles X | | 1899 | " |
| " " Condorcet | | 1901 | " |
| " " Congo | | 1901 | " |
| " " de Marley | | 1901 | " |
| " " Emilie Lemoine | | 1901 | " |
| " " Francisque Morel | | 1901 | " |
| " " La Tour d'Auvergne | | 1901 | " |
| " " Lemoinei | | 1901 | " |
| " " Mad. Casimir Perier | | 1901 | " |
| " " Madame Lemoine | | 1901 | " |
| " " Marie Legraye | | 1901 | " |
| " " Mathieu de Dombasle | | 1901 | " |
| " " Maxime Cornu | | 1901 | " |
| " " Michel Buchner | | 1901 | " |
| " " President Grevy | | 1901 | " |
| " " purpurea | | 1901 | Half hardy. |
| " " rubella | | 1901 | Hardy. |
| " " Virginité | | 1901 | " |
| Tilia americana | Basswood | 1896 | " |
| Ulmus americanus | American elm | 1895 | " |
| Viburnum Lantana | Wayfaring tree | 1898 | Half hardy. |
| " molle | | 1902 | Tender. |
| " Opulus | High-bush Cranberry | 1895 | Hardy. |
| " " sterile | | 1898 | Half hardy. |
| " prunifolium | Nanny-berry | 1899 | Hardy. |

| Botanical name. | Common name. | Planted. | Remarks. |
|---|---|---|---|
| *Coniferae.* | | | |
| Abies balsamea | Balsam fir | 1896 | Hardy. |
| " " variegata | Variegated fir | 1900 | Tender. |
| " lasiocarpa | | 1898 | Half hardy. |
| Juniperus Sabina | Common Savin | 1901 | Hardy. |
| " " variegata | Variegated Savin | 1901 | " |
| " Virginiana elegans variegata | | 1899 | " |
| " " Schotti | | 1899 | " |
| " " tripartita | | 1899 | Tender. |
| Larix europea | European Larch | 1899 | Nearly hardy. |
| " pendula | Tamarack | 1896 | Hardy. |
| Picea alba | White Spruce | 1895 | " |
| " " coerulea | | 1901 | Tender. |
| " " variegata | | 1899 | Hardy. |
| " alcockiana | Alcock's spruce | 1898 | Tender. |
| " Engelmanni | | 1900 | Hardy. |
| " excelsa | Norway spruce | 1895 | Nearly hardy. |
| " " pendula major | | 1899 | Tender. |
| " " pyramidalis | Pyramidal Norway spruce | 1899 | Nearly hardy. |
| " obovata Schrenkiana | | 1899 | Hardy. |
| " pungens | Rocky Mountain spruce | 1895 | " |
| " " glauca | | 1899 | " |
| Pinus banksiana | Jack pine | 1902 | " |
| " Cembra | Stone pine | 1895 | " |
| " laricio nigricans | Austrian pine | 1899 | Tender. |
| " montana | Mountain pine | 1895 | Nearly hardy. |
| " " Mughus | Dwarf mountain pine | 1899 | Half hardy. |
| " sylvestris | Scotch pine | 1895 | Hardy. |
| Pseudotsuga Douglasii | Douglas spruce | 1895 | Nearly hardy. |
| Thuya Occidentalis | White cedar | 1895 | Hardy. |
| " " Columbiae | | 1899 | Nearly hardy. |
| " " Hoveii | Hovey's Arbor-vitae | 1900 | Half hardy. |
| " " Meehani | Meehan's Arbor-vitae | 1900 | Tender. |
| " " Variegata | Variegated cedar | 1899 | Hardy. |
| " " Wareana | Ware's Arbor-vitae | 1899 | Nearly hardy. |

## FRUIT TREES AND BUSHES.

The crop of fruit the past season was disappointing. Crab Apples (Pyrus baccata, &c.) and Raspberries alone gave good crops. Late spring frosts killed either the blossoms or the fruit of all other sorts. A few plums escaped, but were not ripe when frost came in September.

### SEEDLING APPLES.

Two trees of Tonka (seedling) blossomed, and one produced fruit of a good size. The fruit on the second tree was small, but the tree died before they were fully matured, from rabbits eating the bark away last winter.

### PLANTING.

The following seedlings of cross-bred apples were planted in 1902:—

42 seedlings of Novelty.
26 “ Progress.
18 “ Prairie Gem.
42 “ Aurora.
13 “ Belmont.
6 “ Cavan.
1 “ Carleton.

20 seedlings of Charles.
6 “ Pioneer.
2 “ Olive.
16 “ Eastman.
18 “ Eaton.
1 “ Dean.
6 “ Parker.

Last spring the following were planted in the same nursery:—

### CROSS-BRED APPLES.

4 Northern Queen.
4 Derby.
4 Pioneer.
2 Progress.
4 Ruby.
4 Carleton.
4 Aurora.
4 Charles.

Seedlings from seed of Apples from Thos Frankland, Stonewall, Manitoba:—
1 seedling of Maud.
1 seedling Annie.

### APPLE TREES.

3 Hibernal, grafted on Pyrus prunifolia.
3 Wealthy, grafted on Pyrus prunifolia.
2 North-western Greening, grafted on Pyrus baccata.
3 McMahon White, grafted on Pyrus baccata.
3 Yellow Transparent, grafted on Pyrus baccata.
3 Pointed Pipka, grafted on Pyrus prunifolia.
3 Duchess, grafted on Pyrus prunifolia.
3 Scott's Winter, grafted on Martha Crab seedling.
2 McIntosh Red, grafted on Martha Crab seedling.
2 Longfield, grafted on Martha Crab seedling.
3 Russian Seedling, No. 18, grafted on Pyrus prunifolia.
3 Russian Seedling, No. 22, grafted on Pyrus prunifolia.
2 Russian Seedling, No. 7, grafted on Pyrus prunifolia.
1 Russian Seedling, No. 26, grafted on Pyrus prunifolia.

### PLUMS.

The following were planted last spring:—

2 Cheney,
1 Bixby.
2 Aitkin.
1 Mankato.

### CURRANTS.

The following varieties were planted in 1902 in a new nursery, and are being tested:—

*White.*—White Cherry, Frauendorfer White, White Grape, Climax, White Kaiser, White Imperial, Large White, White Dutch, White Transparent.

*Red.*—Victoria, Manitoba Amber, London Red, Early Scarlet, Prince Albert, Wilder, Simcoe King, Large Red, North Star, Red Grape, La Condé, Fay's Prolific, Houghton Castle, Raby Castle, Rankin's Red, Versaillaise, Cherry, Fertile d'Angers.

*Black.*—Eclipse, Sterling, Black English, Gewonhliche, Stewart, Dominion, Success, Beauty, Clipper, Perry, Ethel, Winona, Star, Ontario, Crandall's Missouri, Ogden, Mattie, Black Grape, Merveille de la Gironde, Bang Up, Standard, Perth, Ismay's Prolific Black, Lewis.

### GOOSEBERRIES.

In the same nursery as the currants, the following gooseberries were planted in 1902:—

3 Governess, 2 Smith's Improved, and in 1903—

2 Houghton.
1 Cox's Late Green.
1 Cluster.
2 Downing.
2 Lady Houghton.
1 Carman.

*Also Saunders' Cross-breds.*

2 Merton.
4 Mabel.
2 Edna.
1 Griffin.
1 York.
2 Sandow.
2 Weir.
1 Troy.
2 Richland.
1 Sussex.
4 Pale Red.
6 Red Jacket.
5 Rideau.
1 Ruth.
2 Saunders.
2 Gibb.

## FRUIT CROP.

### PYRUS BACCATA AND PRUNIFOLIA.

Many of these Pyrus trees were loaded with fruit, the best of which were ripe before frost came hard enough to injure them.

### PLUMS.

The plum crop was a failure. Although some trees had considerable fruit, none of it ripened. The Aitkin plum, which is the earliest variety on the farm, had a little fruit, but it disappeared before it had a chance to mature.

The native varieties were no more fruitful than the improved sorts.

### CHERRIES.

All the varieties were more or less killed back, and though blossoms appeared on one variety, no fruit formed.

## SMALL FRUITS.

### CURRANTS.

Red, White and Black Currants were killed by frost after they were well formed. The varieties set out in the spring of 1902 made good progress this year. The following varieties are under test :—

*Black.*—Pomona, Stewart, Clipper, Black Victoria, Black Naples, Native Black, Perry, Eagle, Monarch, Charmer, Beauty, Ontario, Stewart, Ethel, Sterling, Standard, Orton, Star, Madoc, Climax, Kerry Eclipse, Oxford, Winona, Lewis, Prince of Wales.

*Red.*—Fay's Prolific, Wilder, North Star, Raby Castle, Red Dutch, Cherry, Versaillaise, Fertile d'Angers, Prince Albert, Victoria.

*White.*—White Imperial, White Grape, White Dutch.

### RASPBERRIES.

Dr. Reider, Turner, Caroline, Miller, Garfield, Lady Anne, Mary, Marlborough, Kenyon Seedling.

All varieties had a good crop of fruit.

### GOOSEBERRIES.

Houghton, Pearl, Golden Prolific, Columbus, Keepsake, Smith's Improved, Lancashire Lad, Governess.

Blossoms were entirely killed by frost.

### STRAWBERRIES.

Vines were dead when spring opened.

## CATTLE.

The herd of cattle at present consists of 54 head; this includes 18 steers purchased for feeding tests.

The animals raised on the farm are 16 pure-bred Shorthorn cows and heifers, and 19 cross-bred cows, heifers and steers.

The bull 'Arbor,' bred by E. Potter, Lowfield, Kirby Lonsdale, England, imported by the Experimental Farm, Ottawa, and sent up last fall, is at the head of the herd.

The three bulls in use on the farm when my last report was sent in were sold during the fall and early spring.

In December last every animal in the herd was tested for tuberculosis, and I am pleased to report that not one that had been raised on the farm was affected. Fifteen steers had, shortly before that, been purchased for feeding tests. Four of these reacted and were killed. Three were badly affected, while in the fourth the disease was not found, but it had inflammation of the lungs.

The herd was never in better condition than at present.

### FEEDING TEST.

Fifteen three-year-old steers were purchased last November for feeding tests. Out of these, four had to be killed, as already stated.

Ten steers out of the 11 left were chosen and divided into two lots of five each.

Both lots received the same ration during the entire time they were being fed, including the preparatory period and after the test was completed.

The test was for 16 weeks, and commenced on December 11.

Lot No. 1 was turned out each day for two hours.

Lot No. 2 was kept continuously in the stable.

The test was carried on to ascertain whether close confinement was a benefit or not in feeding animals.

The meal used consisted of 2 parts barley and 1 part small wheat.

The first month 6 lbs. per day was given to each animal, and increased each month by 2 lbs.

Hay was fed morning and night, and oat or barley straw at noon. Each animal received all the hay and straw it could eat.

Following will be found a statement of the monthly and total weights and gains of each lot during the period of the test; weights and gain made during the whole period from November 4 to May 2; the total amount and estimated value of the feed consumed during the same time; and a summary of the financial results of the transaction.

It will be observed that Lot No. 2, confined in the stable, made a very small total gain over the lot let out for exercise.

MONTHLY and total weights and gains of each lot of steers during the period of test:—

| Lot. | Weight at start of test. | 1st 4 weeks. |  | 2nd 4 weeks. |  | 3rd 4 weeks. |  | 4th 4 weeks. |  | Total Gain. |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  | Weight. | Gain. | Weight. | Gain. | Weight. | Gain. | Weight. | Gain. |  |
|  | Lbs | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| Lot No. 1.. ... | 6,810 | 7,150 | 340 | 7,380 | 230 | 7,670 | 290 | 7,930 | 260 | 1,120 |
| Lot No. 2..... | 6,700 | 7,070 | 370 | 7,280 | 210 | 7,510 | 230 | 7,720 | 210 | 1,020 |

| Lot. | Weight when bought, November 4. | Weight when sold, May 2. | Gain. |
|---|---|---|---|
|  | Lbs. | Lbs. | Lbs. |
| Lot No. 1 .... .................. ..... ............ | 6,620 | 8,140 | 1,520 |
| Lot No. 2......... . ............................ | 6,465 | 8,080 | 1,615 |
|  | 13,085 | *16,220 | 3,135 |

*Sold less 5 per cent shrinkage, leaving net weight 15,409 lbs.

Total weight and estimated value of feed consumed during the whole period—November 4 to May 2:—

Preparatory feeding, each lot (five steers), 36 days—

| | |
|---|---|
| Straw, 3,600 lbs. at $1 per ton.. .. .. .. .. .. .. .. .. .. .. .... | $ 1 80 |
| Meal, 720 lbs. at ⅔c. per lb. .. .. .. .. .. .. .. .. .. .. .. .. | 4 80 |
|  | $ 6 60 |

Or for both lots, $13.20.

During test* (112 days), each lot—

| | |
|---|---|
| Hay, 10,656 lbs. at $5 per ton.. .. .. .. .. .. .. .. .. .. .. .. .. | $26 64 |
| Meal, 5,040 lbs. at ⅔c. per lb.. .. .. .. .. .. .. .. .. .. .. .. | 33 60 |
| Ground linseed, 210 lbs. at 2c. per lb.. .. .. .. .. .. .. .. .. .. | 4 20 |
|  | $64 44 |

Or for both lots, $128.88.

From end of test till sold (31 days), each lot—

| | |
|---|---|
| Hay, 2,984 lbs. at $5 per ton.. .. .. .. .. .. .. .. .. .. .. .. .. | $ 7 46 |
| Meal, 1,860 lbs. at ⅔c. per lb.. .. .. .. .. .. .. .. .. .. .. .. | 6 20 |
| Ground linseed, 77½ lbs. at 2c. per lb.. .. .. .. .. .. .. .. .. .. | 1 55 |
|  | $15 21 |

Or for both lots, $30.42.

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*Record was not kept of the weight of straw consumed during test.

Summary of cost of feeding—

| | |
|---|---|
| Preparatory feeding.. | $ 13 20 |
| During test.. | 128 88 |
| Till sold.. | 30 42 |
| | $172 50 |

Or for each steer, $17.25.

Or for each lot of five steers, $86.25.

SUMMARY of the Financial result of the Transaction.

| Lot. | Weight bought. | At | Amount paid. | Add Cost of Feed. | Total Cost. | Weight sold. | At | Amount received. | Gain on each lot. | Gain per head. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Lbs. | Cts. | $ cts. | $ cts. | $ cts. | Lbs. | Cts. | $ cts. | $ cts. | $ cts. |
| No. 1...... | 6,620 | 3½ | 231 70 | 86 25 | 317 95 | 7,733 | 4¼ | 328 65 | 10 70 | 2 14 |
| No. 2...... | 6,465 | 3½ | 226 27 | 86 25 | 312 52 | 7,676 | 4¼ | 326 23 | 13 71 | 2 74 |
| Total... | 13,085 | 3½ | 457 97 | 172 50 | 630 47 | 15,409 | 4¼ | 654 88 | 24 41 | * |

* An average net gain of $2.44 per head.

On account of the price of steers being high when purchased and the export value of cattle having fallen considerably by the time the animals could be sold, the amount realized was very little above their cost and the value of feed consumed.

## HORSES.

There are at present 13 horses on the farm. In the spring two young, light horses were exchanged for heavier ones; otherwise the working force remains the same as last year. The health of the horses has been good.

## SWINE.

Three breeds, Berkshire, Tamworth and Improved Yorkshire White are kept on the farm at present. Since the last report nine Berkshire boars and five sows, and six Tamworth boars and three sows have been sold to farmers for breeding purposes.

## POULTRY.

Three breeds are kept on the farm at present, namely: Black Minorcas, Light Brahmas and Plymouth Rocks. All breeds did well. During the 12 weeks from April 3 to June 20, the eggs laid were kept separate and the number laid by each breed recorded, with the following result:—

Black Minorca.—Sixteen hens laid 496 eggs, an average of 31 each hen.

Plymouth Rock.—Eleven hens laid 275 eggs, an average of 25 for each hen.

Light Brahma.—Twelve hens laid 372 eggs, an average of 31 for each hen.

After June 20, the eggs were not kept separate.

## EXHIBITS FOR ST. LOUIS EXHIBITION.

During the past year a large number of exhibits have been prepared and forwarded to Ottawa for the St. Louis Exposition to be held in 1904.

Sixteen large cases of grain and grasses from the crop of 1902 were shipped early in November, and the same number of cases of this year's grain at the end of that month. In addition three cases of fruits and vegetables in bottles, and threshed grain in bags accompanied these shipments.

Fifteen agricultural societies were requested to collect samples from this year's crop from their respective districts. Although all expenses were guaranteed, only one society, Edmonton, sent in anything whatever. A few sheaves were collected by a private party at Moosomin, and I regret that out of the whole of the Territories so little interest has been taken in the matter.

When harvest commenced in 1902, a member of the staff visited the leading grain districts in Assiniboia, Saskatchewan and Alberta, and made arrangements for samples to be sent to the Experimental Farm from the crop then being harvested. I am sorry to say that Pincher Creek alone did anything in the matter.

Samples were collected in the Indian Head district last year of sheaves, and this year of threshed grain by one of the Experimental Farm staff. These have been prepared and sent forward to Ottawa.

## GASOLINE ENGINE.

A gasoline engine was obtained after harvest from Goold, Shapley & Muir, Brantford, Ont., and I am pleased to say gave good satisfaction. The engine 'Ideal' is 18-horse power, and ran a 28-inch 'Advance' separator with apparent ease. Some trouble took place at first through want of knowledge in operating the engine, but this was only temporary.

## DISTRIBUTION OF SAMPLES.

During the months of March, April and May, the following distribution of samples of products of the farm was made to applicants throughout the Territories of Assiniboia, Alberta and Saskatchewan.

### GRAIN.

| | | |
|---|---|---|
| Wheat | 278 | bags, 3 lbs. each. |
| Oats | 411 | “ |
| Barley | 196 | “ |
| Pease | 232 | “ |
| Sundries | 41 | “ |
| Potatoes | 497 | “ |
| Tree seeds.—Maple | 675 | “ 1 lb. each. |
| Grass seed.—Brome | 167 | “ |
| Western Rye | 15 | “ |
| Small seeds | 326 | packages containing 6,155 packets shrub seed, flower seeds, root seeds, garden seeds and corn. |
| Fruit bushes | 163 | packages. |
| Tree and shrub seedlings | 452 | “ |

## CORRESPONDENCE.

During the twelve months ending October 31, 1903, 4,926 letters were received, and 4,980 mailed from this office. In letters received, circular reports on grain and other samples are not counted, and in letters mailed, circulars of instruction sent with grain and other samples are not included.

## METEOROLOGICAL.

| Month. | Temperature. Maximum. | | Temperature. Minimum. | | Snow-fall. | Rain-fall. | | Hours of Bright Sunshine. |
|---|---|---|---|---|---|---|---|---|
| | Date. | Degrees | Date. | Degrees | Inches. | No. of days. | Inches. | |
| 1902. | | | | | | | | |
| November | 2 | 50 | 10 | —10 | 6 | ...... | ........ | 48·4 |
| December | 17 | 32 | 25 | —34 | 13 | ........ | ....... | 43·2 |
| 1903. | | | | | | | | |
| January | 25 | 37 | 12 | —31 | 4 | ...... | ........ | 66·1 |
| February | 26 | 34 | 15 | —42 | 1 | ........ | ........ | 124·2 |
| March | 31 | 55 | 19 | —25 | 3½ | 1 | ·07 | 152·3 |
| April | 26 | 75 | 29 | 4 | 1 | 2 | ·06 | 164·3 |
| May | 14 | 92 | 5 | 21 | ........ | 14 | 4·08 | 200·1 |
| June | 17 | 84 | 10 | 30 | ........ | 8 | 1·29 | 228·1 |
| July | 23 | 86 | 31 | 35 | ........ | 11 | 4·23 | 249·4 |
| August | 20 | 83 | 9 | 40 | ........ | 13 | 4·16 | 164·7 |
| September | 28 | 76 | 27 | 24 | ........ | 10 | 1·26 | 121·2 |
| October | 13 | 75 | 17 | 11 | ........ | 6 | ·40 | 172·6 |
| | | | | | 28½ | 65 | 15·55 | 1,734·6 |

I have the honour to be, sir,

Your obedient servant,

ANGUS MACKAY,

*Superintendent.*

# EXPERIMENTAL FARM FOR BRITISH COLUMBIA.

## REPORT OF THOMAS A. SHARPE, SUPERINTENDENT.

Dr. Wm. Saunders,
Director, Dominion Experimental Farms,
Ottawa.

Sir,—I have the honour to present my report of the progress made and the work done on the Experimental Farm at Agassiz, B.C., for the year 1903. The season was unfavourable in many respects from the early spring until after the crops were secured. The winter was mild and the lowest temperature was 18 above zero on March 11, and there were no very severe wind storms. There was a heavy fall of snow in March, which clung to the branches of the trees as it fell, and many fruit trees were injured. large limbs being split off by the weight of snow. The spring was cold, with frequent showers and with north winds, and the soil remained cold until late in the season, retarding growth in the trees and shrubs, and causing many seeds to fail to germinate, and much of the bloom of the fruit trees to fall off. The weather continued cool throughout, there being only a few days of warm weather during summer. The whole season, and especially during harvest, was cool and showery, which delayed the harvesting and made it more expensive than usual, besides the loss from damaged grain and the shelling of oats and pease in the turnings made necessary by the frequent heavy showers. The crops of grain, roots and hay have been fairly good and prices satisfactory. The fall weather has been mild, with only one fall of snow, and the lowest range of the thermometer up to the present being 22 above zero, enabling farmers to get all roots harvested and other fall work done without delay or injury from frost.

### FRUIT CROP.

The fruit crop has been only a very moderate one, but apples have been freer from scab than usual.

### HEDGES.

The hedges have made a good growth. There are forty-five of them, and that number gives a fairly wide choice to those desiring to plant an ornamental hedge.

### ORNAMENTAL TREES AND SHRUBS.

The shrubs and trees have made a fine growth, especially during the flowering season, were very handsome, and many inquiries are received as to where they can be had the best advantage.

### FOREST AND TIMBER PLANTATIONS.

The forest trees planted in the shelter belt continue to grow vigorously, and a considerable number of the timber and nut trees planted on the mountain are making a fair growth, but as these trees have received no care since planting a great growth is not to be expected, at least until they get up above the hazel and other undergrowth.

## NUT TREES.

The English and American black walnut trees produced a small crop of nuts, and Japanese and heart-shaped walnut trees a fair crop this season. The chestnut trees bloom late in the spring every year, but this year they were so very late that the nuts did not fill. The walnuts of all sorts are being distributed to farmers throughout the province, as in past years, and many of those who received nuts in previous years report good success in raising trees. The pecan trees are growing into strong trees, but are not large enough yet to bear nuts. All of the filbert bushes have grown splendidly, but as in former years, the crop was light, and the bluejays carry off much of the fruit before it is ripe.

## DITCHING.

Owing to the scarcity of labour and the pressure of other work, very little ditching has been done this year.

## NEW BREAKING.

Nearly fifteen acres have been ploughed and cropped for the first time this year, and a small area cleared and partly grubbed, and this work will be continued during the winter as the weather and conditions of the ground permits.

## LIVE STOCK.

The stock bull mentioned in my last report injured one of his hind legs, and although kept in for some months, never recovered, and was finally slaughtered. Three of the four bull calves then mentioned have been sold at satisfactory prices, and the fourth is still on the farm. A young bull has been received from the Central Experimental Farm, and, as he is from imported stock noted for their superior milking qualities and is a nice, well-formed calf, he is likely to be a valuable acquisition to our stock. The present herd consists of seven registered Shorthorn cows, three heifers, two young bulls, two young bull calves and four heifer calves.

## SHEEP.

The flock at present consists of twelve ewes and ewe lambs and two rams, seven head having been sold since my last report. The Dorset Horned breed appears to be well adapted to the damp climate of the coast, and also to make a satisfactory cross with the common sheep.

## PIGS.

The stock at present consists of one white Yorkshire boar and two young sows, two Berkshire boars, two sows and four small cross-bred pigs. The Yorkshire pigs and two of the Berkshires were recently received from the Central Experimental Farm, and are very fine animals.

## HORSES.

The force of horses consists of five of the original purchase made in 1889, and the two young horses bought one year ago. These latter have proved to be very useful horses, and have given good satisfaction. Another team will be necessary for next season's work, owing to the increasing area under cultivation and the age of the old horses.

## BEES.

This has been a poor season for bees, not enough honey having been secured by any one swarm to carry it over. All are being given a little feed now, and we hope thus to carry seven swarms through the winter

## FOWLS.

There are on this farm five breeds of fowls—Light Brahmas, Barred Plymouth Rocks, Black Minorcas, Buff Orpingtons and Rhode Island Reds. The two latter are this year's birds—hatched last spring—so have not been tested, except as to weight of cockerels and general thrift.

Of the three first breeds the Black Minorcas are the best layers, and lay large white eggs, but the Barred Plymouth Rocks come very nearly up to them as layers, and far surpass them as table fowls. The Light Brahmas are good layers, but do not come up in this respect to the Black Minorcas or B. P. Rocks. The feathers on their feet and legs are a disadvantage in this climate, as they keep them damp and cold. They are a very fair table fowl, but do not mature quite so early as is desired.

Both the B. P. Rocks and Light Brahmas are good sitters and good mothers, and are profitable up to the age of two and a half years, when they are apt to get too fat and lay few eggs.

The Buff Orpingtons grow large and rapidly, but with us do not mature as early as the B. P. Rocks and the Rhode Island Reds. The latter is a fine blocky bird, and matures early.

The hens are kept in breeding pens with yards attached, from January 1 to July 1; during the rest of the year they are allowed to run at large. They are not troubled by any disease, except sometimes a little rheumatism, caused by the wet weather, but crows and hawks carry off the chickens, even after they are well grown.

We have had an average of 60 per cent of chickens from eggs hatched in the incubator. These chickens were reared in a brooder and have been strong and healthy and have always done well, but have not been any stronger than those hatched and reared by hens.

The weight of cockerels per pair, live weight, at three months old, were respectively: B. P. Rocks, 8 lbs. 2 ozs.; Light Brahmas, 7 lbs. 8 ozs.; Buff Orpingtons, 7 lbs. 5 os.; Rhode Island Reds, 7 lbs. 10 ozs.; Black Minorcas, 6 lbs.

The hens are fed on mixed grain, $\frac{3}{4}$ wheat, $\frac{1}{8}$ oats and $\frac{1}{8}$ peas; sunflower seeds in the autumn, and boiled roots with some chop (whatever is on hand) mixed in, during the coldest weather in winter.

The hen-house is whitewashed several times a year and otherwise kept clean.

The treatment given to the farm fowls is in every way just what every farmer should and can give his hens.

## EXPERIMENTS WITH OATS.

Fifty-four varieties of oats were tested this year. The land had been in corn the year previous, was fall ploughed and dressed with stable manure during the winter, and this was well worked in with the spade harrow and drag. The crop was very promising and the yield would have been heavy but a considerable portion was shelled during the process of curing owing to the frequent showers.

All were sown April 17, at the rate of two and a half bushels per acre. The soil was a sandy loam and the size of the plots one-fortieth of an acre each. There was scarcely any smut, but the rust was very bad, and materially lowered the yield, and by causing weakness in the straw and consequent falling down of the crop increased the cost of harvesting.

OATS—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Yield per Acre. | | Weight per Bushel. | Rusted. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | Bush. | Lbs. | Lbs. | |
| 1 | Holland | Aug. 18 | 123 | 46 | Stiff | 10 | Sided | 83 | 8 | 34¼ | None. |
| 2 | Bavarian | " 13 | 118 | 42 | Medium | 10 | Branching | 82 | 32 | 34¾ | " |
| 3 | Danish Island | " 19 | 124 | 48 | Stiff | 10 | " | 82 | 22 | 35 | " |
| 4 | Milford (white) | " 12 | 117 | 44 | Weak | 9 | Sided | 82 | 12 | 34½ | Slightly. |
| 5 | Sensation | " 11 | 116 | 42 | Stiff | 9 | Branching | 82 | .. | 34½ | " |
| 6 | Columbus | " 12 | 117 | 44 | Weak | 9 | " | 78 | 28 | 34 | Consid'ably. |
| 7 | Tartar King | " 10 | 115 | 44 | Stiff | 9 | Sided | 77 | 28 | 35 | None. |
| 8 | Abundance | " 17 | 122 | 42 | Medium | 9 | Branching | 75 | 30 | 34 | Consid'ably. |
| 9 | Olive (white) | " 12 | 117 | 46 | " | 9 | Sided | 74 | 4 | 34¾ | Slightly. |
| 10 | White Giant | " 17 | 122 | 46 | Stiff | 9 | Branching | 73 | 28 | 34 | Consid'ably. |
| 11 | Cromwell | " 17 | 122 | 44 | " | 9 | " | 73 | 18 | 34 | Slightly. |
| 12 | Kendal (white) | " 13 | 118 | 44 | Medium | 8 | Half sided | 73 | 8 | 34 | " |
| 13 | Waverley | " 11 | 116 | 44 | Stiff | 10 | Branching | 72 | 12 | 34¾ | " |
| 14 | Irish Victor | " 14 | 119 | 40 | " | 10 | Sided | 72 | 2 | 34½ | " |
| 15 | Golden Tartarian | " 17 | 122 | 44 | " | 12 | " | 71 | 26 | 34 | Badly. |
| 16 | Golden Fleece | " 14 | 119 | 46 | Medium | 9 | Branching | 71 | 6 | 34 | Slightly. |
| 17 | Early Gothland | " 14 | 119 | 46 | Stiff | 9 | " | 69 | 14 | 34½ | " |
| 18 | Siberian | " 13 | 118 | 42 | " | 10 | " | 69 | 4 | 34 | Badly. |
| 19 | Improved Ligowo | " 11 | 116 | 48 | " | 10 | " | 68 | 28 | 34½ | " |
| 20 | American Triumph | " 13 | 118 | 46 | " | 9 | " | 68 | 18 | 34 | Consid'ably. |
| 21 | Probstey | " 11 | 116 | 46 | " | 10 | " | 67 | 8 | 34 | Slightly. |
| 22 | Pense (white) | " 13 | 118 | 48 | " | 9 | " | 66 | 16 | 34¼ | Consid'ably. |
| 23 | Hazlett's Seizure | " 14 | 119 | 48 | " | 10 | " | 66 | 6 | 34 | Slightly. |
| 24 | Early Blossom | " 12 | 117 | 46 | " | 9 | Sided | 65 | 30 | 34 | Badly. |
| 25 | Goldfinder | " 15 | 120 | 44 | " | 10 | Branching | 64 | 24 | 34 | " |
| 26 | Pioneer | " 10 | 115 | 44 | Medium | 9 | " | 64 | 14 | 34½ | Slightly. |
| 27 | Banner | " 13 | 118 | 46 | Stiff | 11 | " | 64 | 4 | 35 | " |
| 28 | Olive (black) | " 14 | 119 | 44 | Medium | 8 | Sided | 63 | 28 | 34 | Badly. |
| 29 | Kendal (black) | " 15 | 120 | 44 | " | 9 | " | 63 | 18 | 34 | " |
| 30 | Joanette | " 11 | 115 | 42 | " | 10 | Branching | 63 | 8 | 34½ | Consid'ably. |
| 31 | Abyssinia | " 17 | 122 | 46 | Stiff | 10 | " | 62 | 32 | 34 | Slightly. |
| 32 | Wide Awake | " 15 | 120 | 42 | Medium | 9 | " | 62 | 22 | 34½ | " |
| 33 | White Schonen | " 13 | 118 | 44 | " | 9 | " | 62 | 12 | 34¾ | Consid'ably. |
| 34 | Early Golden Prolific | " 11 | 116 | 42 | " | 9 | " | 62 | 2 | 34 | Slightly. |
| 35 | Lincoln | " 17 | 122 | 48 | Stiff | 10 | " | 61 | 26 | 34½ | " |
| 36 | Golden Beauty | " 13 | 118 | 48 | " | 9 | " | 61 | 16 | 34 | Consid'ably. |
| 37 | Pense (black) | " 19 | 124 | 46 | " | 9 | " | 61 | 16 | 34¾ | Slightly. |
| 38 | Golden Giant | " 18 | 123 | 46 | " | 9 | Sided | 61 | 6 | 34 | Consid'ably. |
| 39 | Mennonite | " 12 | 117 | 44 | " | 10 | Branching | 61 | 6 | 34 | Badly. |
| 40 | Black Beauty | " 11 | 116 | 48 | Weak | 11 | " | 60 | 30 | 34 | Slightly. |
| 41 | Holstein Prolific | " 15 | 120 | 42 | Stiff | 10 | " | 60 | 20 | 35 | " |
| 42 | Salines | " 19 | 124 | 44 | " | 9 | " | 60 | 10 | 34½ | Badly. |
| 43 | New Zealand | " 21 | 126 | 42 | Medium | 9 | Sided | 59 | 14 | 34 | Slightly. |
| 44 | Swedish Select | " 11 | 116 | 48 | Weak | 9 | Branching | 59 | 4 | 34 | " |
| 45 | Improved American | " 13 | 118 | 46 | Stiff | 9 | " | 58 | 28 | 34 | Badly. |
| 46 | Buckbee's Illinois | " 19 | 124 | 46 | " | 9 | " | 58 | 28 | 34½ | Slightly. |
| 47 | American Beauty | " 15 | 120 | 43 | Medium | 11 | " | 58 | 18 | 34 | Badly. |
| 48 | Scotch Potato | " 15 | 120 | 42 | Stiff | 10 | " | 57 | 32 | 35 | Slightly. |
| 49 | Longhoughton | " 17 | 122 | 40 | Medium | 9 | " | 57 | 22 | 34½ | " |
| 50 | Wallis | " 17 | 122 | 46 | Stiff | 8 | " | 56 | 16 | 34 | " |
| 51 | Twentieth Century | " 12 | 117 | 42 | " | 11 | " | 55 | 20 | 34 | " |
| 52 | Milford (black) | " 14 | 119 | 39 | Weak | 8 | " | 55 | 10 | 34 | Consid'ably. |
| 53 | Salzer's Big Four | " 15 | 120 | 38 | Medium | 9 | " | 54 | 10 | 34 | Slightly. |
| 54 | Thousand Dollar | " 14 | 119 | 44 | " | 10 | " | 52 | 32 | 34 | " |

## EXPERIMENTS WITH BARLEY.

Thirty-five varieties of barley were tested, fifteen of two-rowed and twenty of six-rowed. The soil chosen for these plots was a rather gravelly loam, with an open gravel bottom. It was fall ploughed and covered with a dressing of farm-yard manure during the winter, and this was well mixed with the soil and the seed sown.

(Photo. by C. E. Saunders.)

Road planting and Superintendent's residence at Agassiz.

The yield has been good, but the grain was much discoloured by the weather. All were sown on April 20, on plots of one-fortieth of an acre each, and all the barleys were free from rust and smut.

BARLEY, TWO-ROWED.—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Inches. | | In. | Bush. | Lbs. | Lbs. |
| 1 | Dunham | Aug. 12 | 114 | 42 | Stiff & bright | 3½ | 76 | 32 | 49 |
| 2 | Beaver | 〃 15 | 117 | 35 | Medium | 3½ | 75 | .. | 49¼ |
| 3 | Gordon | 〃 6 | 108 | 46 | Stiff | 3 | 73 | 26 | 48½ |
| 4 | Sidney | 〃 15 | 117 | 44 | Medium | 3½ | 73 | 16 | 49 |
| 5 | French Chevalier | 〃 15 | 117 | 46 | Stiff | 4 | 70 | 40 | 49 |
| 6 | Canadian Thorpe | 〃 12 | 114 | 46 | Stiff & bright | 3 | 69 | 28 | 48½ |
| 7 | Standwell | 〃 13 | 115 | 44 | 〃 | 3 | 67 | 4 | 48 |
| 8 | Invincible | 〃 13 | 115 | 42 | 〃 | 3 | 66 | 12 | 48½ |
| 9 | Harvey | 〃 10 | 110 | 40 | Stiff | 3½ | 65 | 40 | 48 |
| 10 | Danish Chevalier | 〃 13 | 115 | 40 | Medium | 3 | 65 | 20 | 48 |
| 11 | Newton | 〃 7 | 109 | 44 | Stiff & bright | 3 | 62 | 44 | 48¼ |
| 12 | Logan | 〃 10 | 112 | 42 | Stiff | 4 | 61 | 12 | 48½ |
| 13 | Clifford | 〃 7 | 109 | 46 | Stiff & bright | 3½ | 59 | 28 | 48½ |
| 14 | Fulton | 〃 14 | 116 | 40 | Medium | 3 | 57 | 44 | 48 |
| 15 | Jarvis | 〃 7 | 109 | 46 | Stiff | 3½ | 56 | 32 | 48 |

BARLEY, SIX-ROWED.—TEST OF VARIETIES.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Mensury | Aug. 3 | 105 | 42 | Stiff | 3 | 80 | .. | 49 |
| 2 | Mansfield | 〃 7 | 109 | 40 | Stiff & bright | 2½ | 73 | 16 | 48½ |
| 3 | Stella | 〃 12 | 114 | 36 | Weak | 3 | 72 | 24 | 48 |
| 4 | Brome | 〃 1 | 103 | 42 | Medium | 2½ | 71 | 32 | 48½ |
| 5 | Oderbruch | 〃 1 | 103 | 40 | Stiff | 3 | 71 | 12 | 48 |
| 6 | Royal | July 29 | 100 | 42 | 〃 | 3 | 68 | 36 | 48½ |
| 7 | Empire | Aug. 7 | 109 | 38 | Stiff & bright | 3 | 68 | 36 | 48½ |
| 8 | Common | July 30 | 101 | 40 | Medium | 3 | 67 | 4 | 49 |
| 9 | Argyle | Aug. 6 | 108 | 40 | Stiff | 3 | 65 | 40 | 48¾ |
| 10 | Trooper | 〃 7 | 109 | 36 | Weak | 3 | 65 | 20 | 48 |
| 11 | Rennie's Improved | July 31 | 102 | 40 | Medium | 3 | 65 | 20 | 48½ |
| 12 | Nugent | Aug. 7 | 109 | 44 | Stiff & bright | 3 | 65 | 20 | 48½ |
| 13 | Baxter | 〃 1 | 103 | 40 | Medium | 2½ | 64 | 28 | 48 |
| 14 | Claude | 〃 3 | 105 | 42 | Stiff | 3 | 62 | 4 | 48 |
| 15 | Albert | 〃 7 | 109 | 40 | Medium | 2½ | 61 | 32 | 48¼ |
| 16 | Champion | July 28 | 99 | 42 | Stiff | 3 | 61 | 32 | 48 |
| 17 | Summit | Aug. 7 | 109 | 42 | Medium | 3 | 60 | 20 | 48 |
| 18 | Odessa | July 29 | 100 | 43 | 〃 | 3 | 58 | 16 | 48 |
| 19 | Yale | Aug. 7 | 109 | 40 | Stiff & bright | 2½ | 55 | .. | 48 |
| 20 | Garfield | 〃 7 | 109 | 42 | Medium | 3 | 55 | .. | 48 |

## EXPERIMENTS WITH SPRING WHEAT.

Sixty varieties of spring wheat were tested this year, on plots of one-fortieth of an acre each. The soil was a fairly fertile sandy loam which had produced a heavy crop of corn and clover sod in 1902, and was fall ploughed in fall of 1902 and given a light top dressing of stable manure during the winter, and was well prepared for the seed before sowing. All the varieties were sown on April 15. The crop was handled so much after cutting, on account of the rain, that a good deal of it was shelled. The wheats were sown at the rate of one and a half bushels per acre, and they were not affected either by rust or smut.

SPRING WHEAT—TEST OF VARIETIES.

| Number. | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | In. | | Bush. | Lbs. | Lbs. |
| 1 | Percy | Aug. 10 | 114 | 48 | Stiff and bright | 3 | Beardless | 46 | 40 | 60 |
| 2 | Australian No. 19 | ″ 10 | 114 | 48 | ″ | 3 | ″ | 44 | .. | 60 |
| 3 | Advance | ″ 10 | 114 | 44 | ″ | 3 | Bearded | 42 | 40 | 60¾ |
| 4 | Plumper | ″ 11 | 115 | 40 | ″ | 3 | ″ | 42 | .. | 61 |
| 5 | Hastings | ″ 8 | 112 | 40 | Medium | 3¼ | Beardless | 41 | 40 | 60½ |
| 6 | Bishop | ″ 11 | 115 | 42 | ″ | 3 | ″ | 41 | 40 | 60 |
| 7 | Monarch | ″ 17 | 121 | 43 | Stiff and bright | 3 | ″ | 41 | 20 | 61 |
| 8 | Cartier | ″ 10 | 114 | 44 | Stiff | 3 | Bearded | 41 | 20 | 60 |
| 9 | White Connell | ″ 17 | 121 | 40 | Stiff and bright | 2½ | Beardless | 41 | 10 | 60½ |
| 10 | Wellman's Fife | ″ 19 | 123 | 48 | Medium | 3½ | ″ | 41 | .. | 61½ |
| 11 | Clyde | ″ 19 | 123 | 40 | ″ | 3 | ″ | 41 | .. | 60½ |
| 12 | Alpha | ″ 14 | 118 | 46 | Stiff and bright | 3 | ″ | 40 | 50 | 61 |
| 13 | Laurel | ″ 17 | 121 | 44 | ″ | 3½ | ″ | 40 | 40 | 60¾ |
| 14 | Australian No. 27 | ″ 17 | 121 | 43 | ″ | 3 | ″ | 40 | 30 | 61½ |
| 15 | Preston | ″ 15 | 119 | 44 | Medium | 3 | ″ | 40 | 20 | 61 |
| 16 | Red Fern | ″ 17 | 121 | 42 | ″ | 3½ | Bearded | 40 | 20 | 60½ |
| 17 | Fraser | ″ 10 | 114 | 44 | Stiff and bright | 3 | ″ | 40 | 10 | 61 |
| 18 | Benton | ″ 19 | 123 | 44 | ″ | 2½ | Beardless | 40 | 10 | 60 |
| 19 | White Russian | ″ 19 | 123 | 46 | ″ | 4 | ″ | 40 | .. | 61 |
| 20 | Blair | ″ 20 | 124 | 46 | Medium | 3 | ″ | 40 | .. | 60 |
| 21 | Roumanian | ″ 15 | 119 | 46 | ″ | 3 | Bearded | 39 | 50 | 60 |
| 22 | Countess | ″ 11 | 115 | 42 | Stiff and bright | 4 | Beardless | 39 | 40 | 61 |
| 23 | Essex | ″ 16 | 120 | 44 | ″ ″ | 4 | ″ | 39 | 30 | 61 |
| 24 | Minnesota No. 163 | ″ 18 | 122 | 42 | ″ | 3½ | ″ | 39 | 20 | 61 |
| 25 | Cassel | ″ 22 | 126 | 42 | Weak | 2½ | ″ | 39 | 20 | 60 |
| 26 | Goose | ″ 10 | 114 | 46 | Stiff and bright | 3½ | Bearded | 39 | 10 | 60½ |
| 27 | Crown | ″ 11 | 115 | 46 | ″ | 3 | ″ | 39 | .. | 61 |
| 28 | Robin's Rust Proof | ″ 12 | 116 | 40 | Weak | 3 | Beardless | 39 | .. | 60 |
| 29 | Byron | ″ 10 | 114 | 46 | Medium | 3 | Bearded | 38 | 50 | 60½ |
| 30 | Australian No. 25 | ″ 12 | 116 | 45 | Stiff and bright | 3½ | Beardless | 38 | 40 | 61 |
| 31 | Huron | ″ 11 | 115 | 42 | ″ | 3½ | Bearded | 38 | .. | 61 |
| 32 | Stanley | ″ 14 | 118 | 46 | ″ | 3½ | Beardless | 37 | 50 | 60 |
| 33 | Australian No. 10 | ″ 18 | 122 | 46 | ″ | 3 | ″ | 37 | 40 | 61 |
| 34 | Crawford | ″ 8 | 112 | 44 | Medium | 3 | ″ | 37 | 30 | 60 |
| 35 | Red Swedish | ″ 10 | 114 | 46 | Stiff and bright | 3½ | Bearded | 37 | 20 | 61½ |
| 36 | Minnesota No. 181 | ″ 21 | 125 | 44 | ″ | 3½ | Beardless | 37 | .. | 60½ |
| 37 | Minnesota No. 149 | ″ 18 | 122 | 41 | ″ | 3 | ″ | 36 | 50 | 61 |
| 38 | Admiral | ″ 15 | 119 | 46 | ″ | 3½ | ″ | 36 | 50 | 60 |
| 39 | Early Riga | ″ 8 | 112 | 40 | Weak | 2¾ | ″ | 36 | 40 | 60 |
| 40 | White Fife | ″ 14 | 118 | 46 | Stiff and bright | 3 | ″ | 36 | 30 | 60½ |
| 41 | Colorado | ″ 20 | 124 | 44 | ″ | 3½ | Bearded | 36 | 20 | 60½ |
| 42 | Hungarian | ″ 12 | 116 | 44 | Medium | 3½ | ″ | 36 | .. | 61½ |
| 43 | Red Fife | ″ 17 | 121 | 46 | ″ | 3 | Beardless | 36 | .. | 60½ |
| 44 | Australian No. 9 | ″ 18 | 122 | 46 | Stiff and bright | 3 | ″ | 35 | 50 | 61 |
| 45 | Pringle's Champlain | ″ 15 | 119 | 40 | ″ | 3 | ″ | 35 | 40 | 60 |
| 46 | Australian No. 13 | ″ 18 | 122 | 44 | Medium | 3 | ″ | 35 | 30 | 60 |
| 47 | Rio Grande | ″ 18 | 122 | 46 | Weak | 3½ | ″ | 35 | 20 | 60 |
| 48 | Progress | ″ 18 | 122 | 40 | Medium | 3 | ″ | 35 | 20 | 60 |
| 49 | Herisson Bearded | ″ 19 | 123 | 40 | Weak | 3½ | Bearded | 34 | 40 | 60 |
| 50 | Norval | ″ 8 | 112 | 42 | Stiff | 3 | Beardless | 34 | 40 | 60 |
| 51 | Australian No. 23 | ″ 18 | 122 | 46 | Stiff and bright | 3½ | ″ | 34 | 30 | 60 |
| 52 | Minnesota No. 169 | ″ 20 | 124 | 46 | ″ | 3½ | ″ | 34 | 20 | 60½ |
| 53 | Weldon | ″ 19 | 123 | 44 | Medium | 3 | ″ | 34 | 20 | 60 |
| 54 | Angus | ″ 12 | 116 | 42 | ″ | 3 | ″ | 33 | 30 | 60 |
| 55 | Chul Bidai | ″ 6 | 110 | 36 | Weak | 3 | Bearded | 33 | 10 | 60 |
| 56 | Chester | ″ 11 | 115 | 42 | ″ | 2½ | Beardless | 33 | 10 | 60 |
| 57 | Vernon | ″ 11 | 115 | 46 | Stiff and bright | 3½ | Bearded | 32 | 50 | 60 |
| 58 | Japanese | ″ 8 | 112 | 40 | Medium | 2½ | ″ | 32 | 40 | 60 |
| 59 | Adjini | ″ 4 | 108 | 38 | Weak | 2 | ″ | 32 | 40 | 60 |
| 60 | Dawn | ″ 11 | 115 | 48 | Stiff and bright | 3½ | Beardless | 30 | 40 | 60 |

## WHEAT.

### FALL VERSUS SPRING SOWING.

Two varieties were included in this test, both varieties being sown September 22 for the fall test, and April 25 for the spring test. The land was in fairly fertile condition and was well prepared for the seed in each instance, and the fall sown plots received a light harrowing with the drag, when the spring sowing was made. The fall sown yield was much the heaviest, as will be seen by the accompanying record, and the grain is finer looking.

| Name of Variety. | Date of Sowing. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Yield per Acre. | | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | In. | | Inches. | | Bush. | Lbs. | Lbs. |
| Oregon Club.............. | Sept. 22 | Jul. 29 | ... | 44 | Stiff..... | 2 | Beardless. | 49 | 20 | 60 |
| " "............... | Apr. 25 | Aug. 20 | 117 | 44 | Medium.. | 2 | " | 37 | 20 | 60 |
| Blue Stem.............. | Sept. 22 | Jul. 29 | .... | 46 | Stiff . . | 3½ | " | 46 | 40 | 60 |
| " .................... | Apr. 25 | Aug. 20 | 117 | 46 | Medium.. | 3½ | " | 38 | 40 | 60 |
| Blue Stem from Brandon.... | Apr. 25 | Aug. 20 | 117 | 46 | Medium.. | 3½ | " | 37 | 20 | 60 |

## EMMER AND SPELT.

Six varieties of emmer and spelt were sown this year. The land for these plots had produced a crop of potatoes following rape, which had been turned under and which left the land in very good condition. The yields of grain and straw are fairly good, but the straw was of no use for forage, as it was badly discoloured by rain before it was cured.

| Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Head. | Kind of Head. | Weight of Straw per Acre. | Yield per Acre. |
|---|---|---|---|---|---|---|---|---|
| | | | In. | | Inches. | | Lbs. | Lbs. |
| South Dakota No. 3 .......... | Aug. 20.. | 132 | 42 | Medium.. | 2½ | Bearded.. | 5,100 | 2,130 |
| South Dakota No. 524 ...... | " 20. | 132 | 40 | " .. | 2½ | " .. | 4,950 | 2,040 |
| Red Spelt.................... | " 20.. | 132 | 42 | " .. | 3½ | Beardless. | 4,600 | 1,960 |
| Thick Emmer ................ | " 10.. | 122 | 40 | " .. | 2 | Bearded.. | 5,000 | 1,920 |
| White Bearded Spelt......... | " 12.. | 124 | 44 | Stiff...... | 4 | " .. | 5,120 | 1,720 |
| Common Emmer (Speltz).... | " 18.. | 122 | 40 | Weak .... | 2½ | " .. | .. .. | 2,190 |

## EXPERIMENTS WITH PEASE.

Forty-two varieties of pease were tested this year on plots of one-fortieth of an acre each. The soil was a fertile clay loam and all the plots were sown on April 21. The vines made a vigorous growth, and were well podded, but a considerable loss was sustained by shelling before they could be properly cured and housed.

PEASE—TEST OF VARIETIES.

| Number | Name of Variety. | Date of Ripening. | No. of Days Maturing. | Length of Straw. | Character of Straw. | Length of Pod. | Size of Pea. | Weight of Straw per plot. | Yield per Acre |  | Weight per Bushel. |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | In. |  | In. |  | Lbs. | Bush. | Lbs. | Lbs. |
| 1 | Early Britain | Aug. 15.. | 116 | 52 | Strong.. | 3 | Medium | 155 | 46 | 40 | 61½ |
| 2 | Large White Marrowfat | " 21.. | 122 | 52 | " .. | 3 | Large... | 160 | 46 | 20 | 62 |
| 3 | German White | " 17.. | 118 | 54 | " .. | 3 | Medium | 163 | 46 | 20 | 62½ |
| 4 | Carleton | " 17.. | 118 | 70 | " .. | 2½ | " .. | 168 | 45 | 20 | 61¾ |
| 5 | Arthur | " 15.. | 116 | 50 | " .. | 3 | Large... | 165 | 44 | 40 | 62 |
| 6 | Macoun | . 15.. | 116 | 56 | Medium | 2½ | . .. | 180 | 44 | 20 | 61½ |
| 7 | Chancellor | " 20.. | 121 | 56 | Strong.. | 3 | Medium | 154 | 44 | .. | 62½ |
| 8 | Pearl | " 20.. | 121 | 76 | " .. | 3 | Large... | 165 | 42 | 40 | 60¾ |
| 9 | Lanark | " 15.. | 116 | 48 | " .. | 2½ | " .. | 168 | 42 | 20 | 61½ |
| 10 | Mummy | " 18.. | 119 | 58 | " .. | 3 | Medium | 148 | 42 | .. | 62 |
| 11 | Centennial | " 18.. | 119 | 64 | " .. | 2½ | " .. | 170 | 41 | 30 | 61¾ |
| 12 | Nelson | " 17.. | 118 | 58 | " .. | 3 | " .. | 160 | 40 | 40 | 60 |
| 13 | Paragon | " 22.. | 123 | 62 | " .. | 2½ | " .. | 145 | 40 | 10 | 60½ |
| 14 | White Wonder | " 21.. | 122 | 61 | " .. | 2½ | " .. | 160 | 40 | . | 61 |
| 15 | Agnes | " 21.. | 122 | 62 | " .. | 3 | " .. | 156 | 39 | 20 | 61¼ |
| 16 | New Potter | " 21.. | 122 | 70 | " .. | 3 | Large .. | 143 | 39 | 10 | 61 |
| 17 | Wisconsin Blue | " 18.. | 119 | 64 | " .. | 2½ | Small .. | 155 | 39 | .. | 61½ |
| 18 | Black Eyed Marrowfat | " 22.. | 123 | 60 | " .. | 3 | Large... | 145 | 38 | 50 | 60 |
| 19 | King | " 20.. | 121 | 58 | " .. | 3 | " .. | 130 | 38 | .. | 60 |
| 20 | Crown | " 21.. | 122 | 54 | " .. | 2½ | Small... | 140 | 37 | 40 | 61 |
| 21 | Golden Vine | " 18.. | 119 | 64 | " .. | 2½ | " .. | 149 | 36 | 40 | 61¼ |
| 22 | Pride | " 22.. | 123 | 58 | " .. | 2½ | Large... | 125 | 36 | 20 | 60½ |
| 23 | Oddfellow | " 18.. | 119 | 48 | Medium | 3 | Medium | 163 | 36 | .. | 61 |
| 24 | Canadian Beauty | " 18.. | 119 | 58 | Strong.. | 3 | Large... | 160 | 35 | 50 | 61 |
| 25 | Prince Albert | " 18.. | 119 | 56 | Medium | 2½ | Small... | 138 | 35 | 30 | 61 |
| 26 | Daniel O'Rourke | " 15.. | 116 | 36 | " .. | 2½ | " .. | 140 | 35 | 30 | 61 |
| 27 | Mackay | " 20.. | 121 | 58 | Strong.. | 3 | Medium | 140 | 35 | 20 | 60 |
| 28 | Kent | " 18.. | 119 | 56 | " .. | 3 | Large... | 166 | 35 | 10 | 60 |
| 29 | Prussian Blue | " 20.. | 121 | 50 | " .. | 3 | Medium | 125 | 34 | 50 | 61 |
| 30 | Bruce | " 19. | 120 | 52 | " .. | 3 | Large... | 165 | 34 | 10 | 60 |
| 31 | Fergus | " 20.. | 121 | 52 | " .. | 3 | Medium | 135 | 33 | 50 | 60½ |
| 32 | Duke | " 19.. | 120 | 60 | " .. | 2½ | Large... | 148 | 33 | 40 | 60 |
| 33 | English Grey | " 15.. | 116 | 60 | Medium | 3 | Medium | 143 | 33 | 30 | 60 |
| 34 | Archer | " 21.. | 122 | 54 | Strong.. | 2½ | " .. | 135 | 33 | 20 | 60 |
| 35 | Alma | " 22.. | 123 | 58 | " .. | 2½ | Large... | 125 | 33 | 10 | 60 |
| 36 | Prince | " 20.. | 121 | 48 | " .. | 3 | " .. | 143 | 33 | .. | 60 |
| 37 | Perth | " 17.. | 118 | 52 | " .. | 2½ | " .. | 125 | 32 | 40 | 60½ |
| 38 | Elliot | " 22.. | 123 | 64 | " .. | 2½ | Medium | 125 | 32 | 30 | 60 |
| 39 | Picton | " 20.. | 121 | 54 | " .. | 2½ | " .. | 135 | 32 | 20 | 60 |
| 40 | Victoria | " 18.. | 119 | 54 | Medium | 3 | " .. | 130 | 32 | .. | 60 |
| 41 | Trilby | " 22 : | 123 | 62 | Strong.. | 2½ | " .. | 150 | 31 | 40 | 60 |
| 42 | Gregory | *a* 18.. | 119 | 58 | " .. | 3 | " .. | 120 | 31 | 10 | 60 |

## EXPERIMENTS WITH INDIAN CORN.

Twenty-three varieties of Indian corn were tested this year. All were planted May 20 and cut October 8 and 9. The land was a clay loam which had been ploughed the fall before, turning under a fine growth of clover. It was well harrowed several times during the spring, to start weed seeds and destroy the weeds. The crop was very late on account of cold and wet weather, but a few of the earlier sorts produced well, the ears being in roasting condition when cut. All the varieties were planted both in drills and hills. The rows were three feet apart and the hills three feet apart each way. The rows were thinned, leaving the plants six inches apart.

INDIAN CORN—TEST OF VARIETIES.

| Number. | Name of Variety. | When Tasselled. | In Silk. | Early Milk. | Condition when Cut. | Weight per Acre grown in rows. | | Weight per Acre grown in hills. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tons. | Lbs. | Tons. | Lbs. |
| 1 | Red Cob Ensilage | Aug. 28 | Sept. 2 | Sept. 20 | Late milk | 31 | 480 | 22 | 1,980 |
| 2 | Angel of Midnight | " 28 | " 14 | " 30 | Early milk | 26 | 580 | 23 | 800 |
| 3 | Pride of the North | " 31 | " 14 | Oct. 8 | " | 26 | 350 | 22 | 1,760 |
| 4 | Superior Fodder | Sept. 6 | " 24 | | Ears formed | 25 | 1,480 | 23 | 1,740 |
| 5 | Early Mastodon | " 6 | Oct. 3 | | In silk | 24 | 1,940 | 18 | 1,400 |
| 6 | Giant Prolific Ensilage | " 4 | Sept. 26 | | Ears formed | 24 | 1,720 | 22 | 1,430 |
| 7 | Thoroughbred White Flint | " 8 | " 30 | | In silk | 24 | 1,500 | 23 | 860 |
| 8 | Salzer's All Gold | " 8 | " 30 | | " | 24 | 1,280 | 22 | 1,430 |
| 9 | North Dakota White | Aug. 28 | " 12 | | Early milk | 24 | 400 | 20 | 480 |
| 10 | Mammoth Cuban | " 30 | " 14 | | " | 23 | 1,960 | 24 | 620 |
| 11 | Eureka | " 30 | " 15 | | " | 22 | 1,760 | 23 | 420 |
| 12 | Compton's Early | " 20 | Aug. 28 | Sept. 24 | Late milk | 22 | 220 | 21 | 1,010 |
| 13 | Early Butler | " 28 | Sept. 10 | " 30 | Early milk | 21 | 1,560 | 19 | 280 |
| 14 | Mammoth 8-rowed Flint | Sept. 4 | " 15 | Oct. 4 | " | 21 | 570 | 22 | 220 |
| 15 | Champion White Pearl | " 6 | " 24 | " 12 | " | 20 | 480 | 21 | 1,120 |
| 16 | King Philip | Aug. 28 | " 20 | | Ears formed | 20 | 40 | 18 | 1,620 |
| 17 | Selected Leaming | " 30 | " 28 | | Early milk | 18 | 80 | 17 | 870 |
| 18 | Cloud's Early Yellow | " 22 | " 14 | Oct. 4 | " | 17 | 1,860 | 17 | 430 |
| 19 | Longfellow | " 24 | " 12 | Sept. 24 | Roasting | 17 | 870 | 17 | 1,860 |
| 20 | King of the Earliest | Sept. 3 | " 28 | | Ears formed | 17 | 650 | 18 | 80 |
| 21 | White Cap Yellow Dent | " 4 | " 16 | Sept. 30 | Early milk | 16 | 1,220 | 16 | 10 |
| 22 | Evergreen Sugar | " 10 | " 28 | | Ears formed | 16 | 780 | 15 | 360 |
| 23 | Sanford | " 10 | " 26 | | " | 15 | 1,46 | 12 | 1,740 |

INDIAN CORN SOWN AT DIFFERENT DISTANCES APART.

The same varieties that were used in this test last year were chosen again this year. They were planted alongside the main crop, both in drills and hills. In the drills the plants were thinned to about six inches and to three plants in the hills.

Three feet apart in drills appears to be the best distance, as that gives room for the best development of the plant, and at the same time no space appears to be wasted. These plots were planted May 20 and cut October 2.

INDIAN CORN.—SOWN AT DIFFERENT DISTANCES APART.

| Name of Variety. | Distance in rows. | Distance in hills. | Condition when Cut. | Weight per Acre—grown in rows. | | Weight per acre—Grown in hills. | |
|---|---|---|---|---|---|---|---|
| | in. | in. | | Tons. | Lbs. | Tons. | Lbs. |
| Champion White Pearl | 21 | 21 | Early milk | 17 | 540 | 16 | 340 |
| " " | 28 | 28 | " | 18 | 960 | 17 | 1,200 |
| " " | 35 | 35 | Late milk | 20 | 1,580 | 19 | 1,720 |
| " " | 42 | 42 | " | 17 | 1,640 | 17 | 980 |
| Selected Leaming | 21 | 21 | Early milk | 15 | 1,240 | 14 | 1,360 |
| " | 28 | 28 | " | 16 | 1,220 | 16 | 780 |
| " | 35 | 35 | Late milk | 20 | 260 | 18 | 1,510 |
| " | 42 | 42 | " | 18 | 300 | 17 | 430 |
| Longfellow | 21 | 21 | Early milk | 13 | 180 | 12 | 860 |
| " | 28 | 28 | " | 13 | 1,720 | 13 | 510 |
| " | 35 | 35 | Late milk | 19 | 1,600 | 18 | 1,400 |
| " | 42 | 42 | " | 18 | 1,280 | 18 | 520 |

### TEST OF SUPERPHOSPHATE OF LIME ON INDIAN CORN.

This test was made on sandy land, which had produced a crop of clover the previous year, and a heavy aftermath was turned under early in September. The corn was planted in hills three feet apart each way, and the fertilizer was applied on the surface about the hills just as the corn was coming up, and worked in lightly with a hoe.

| Name of Variety. | Date of Sowing. | When Cut. | Yield per Acre. | | Remarks. |
|---|---|---|---|---|---|
| | | | Tons. | Lbs. | |
| 1 Longfellow, superphosphate 100 lbs... | May 20 | Oct. 2 | 18 | 1,950 | Well eared and corn nearly glazed |
| 2 " " 150 " .. | " 20 | " 2 | 19 | 1,160 | " " " " |
| 3 " " 200 " .. | " 20 | " 2 | 21 | 240 | " " " " |
| 4 " no fertilizer. ........... | " 20 | " 2 | 17 | 430 | " but corn in early milk. |

## EXPERIMENTS WITH TURNIPS.

Twenty-one varieties of turnips were tested under practically the same conditions. The soil was a sandy loam, which was in clover in 1902, and in October of that year the aftermath was ploughed under and the land dressed with farm-yard manure during the winter which in spring was thoroughly worked into the soil with spade harrow and drag. Two sowings of each sort were made, 4 rows 100 feet long of each sort at each sowing. The first series of plots were sown May 13, and the second sowing May 27. The rows or drills were 30 inches apart, and, as in the mangels, the first sown have averaged the best returns. The yield has been calculated from the weight of crop obtained from the two centre rows in each plot.

### TURNIPS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1st Plot. | | | | 2nd Plot. | | | |
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Emperor Swede | 47 | 1,270 | 1,587 | 50 | 38 | 1,200 | 1,287 | .. |
| 2 | East Lothian | 45 | 1,410 | 1,519 | 10 | 38 | 1,550 | 1,292 | 30 |
| 3 | Perfection Swede | 45 | 1,080 | 1,518 | .. | 36 | 930 | 1,215 | 30 |
| 4 | Hall's Westbury | 42 | 1,800 | 1,430 | .. | 36 | 600 | 1,210 | .. |
| 5 | Imperial Swede | 41 | 1,820 | 1,397 | .. | 39 | 1,200 | 1,320 | .. |
| 6 | Good Luck | 41 | 1,490 | 1,394 | 50 | 37 | 1,240 | 1,254 | .. |
| 7 | Mammoth Clyde | 41 | 1,160 | 1,386 | .. | 39 | 540 | 1,309 | .. |
| 8 | Halewood's Bronze Top | 40 | 520 | 1,342 | .. | 41 | 500 | 1,375 | 40 |
| 9 | Elephant's Master | 40 | 355 | 1,339 | 15 | 36 | 765 | 1,212 | 45 |
| 10 | New Century | 39 | 1,860 | 1,331 | .. | 39 | 1,200 | 1,320 | .. |
| 11 | Bangholm Selected | 38 | 1,880 | 1,298 | .. | 31 | 1,360 | 1,056 | .. |
| 12 | Jumbo | 38 | 890 | 1,281 | 30 | 38 | 1,880 | 1,298 | .. |
| 13 | Skirving | 37 | 1,240 | 1,254 | .. | 35 | 620 | 1,177 | .. |
| 14 | Halewood's Bronze Top | 37 | 580 | 1,243 | . | 40 | 520 | 1,342 | .. |
| 15 | Drummond Purple Top | 36 | 1,755 | 1,229 | 15 | 33 | 495 | 1,108 | 15 |
| 16 | Carter's Elephant | 36 | 1,260 | 1,221 | .. | 38 | 1,220 | 1,287 | .. |
| 17 | Kangaroo | 35 | 1,610 | 1,193 | 30 | 34 | 1,630 | 1,160 | 30 |
| 18 | Shamrock Purple Top | 34 | 1,960 | 1,166 | .. | 32 | 680 | 1,078 | .. |
| 19 | Magnum Bonum | 33 | 1,320 | 1,122 | .. | 36 | 1,590 | 1,226 | 30 |
| 20 | Sutton's Champion | 33 | 660 | 1,111 | .. | 36 | 1,920 | 1,232 | .. |
| 21 | Selected Purple Top | 31 | 1,360 | 1,056 | .. | 37 | 1,240 | 1,254 | .. |

## EXPERIMENTS WITH MANGELS.

Sixteen varieties of mangels were sown in two sets of plots, one was sown on April 28, and the second May 12. Early sowing has given the best results. The soil was similar to that on which the turnips were sown, and its preparation and treatment the same. Four drills at thirty inches apart and one hundred feet long were sown in each case, and the yield per acre is computed from the produce of sixty-six feet of the two centre rows of each plot. Both sets of plots were dug October 22.

MANGELS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1st Plot. | | | | 2nd Plot. | | | |
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Mammoth Long Red | 48 | 1,185 | 1,619 | 45 | 46 | 1,555 | 1,559 | 15 |
| 2 | Half Long Sugar Rosy | 41 | 830 | 1,380 | 30 | 38 | 1,220 | 1,287 | .. |
| 3 | Half Long Sugar White | 40 | 25 | 1,333 | 45 | 46 | 1,390 | 1,556 | 30 |
| 4 | Mammoth Yellow Intermediate | 39 | 1,695 | 1,328 | 15 | 34 | 1,630 | 1,165 | 30 |
| 5 | Selected Yellow Globe | 39 | 1,200 | 1,320 | .. | 35 | 1,940 | 1,199 | .. |
| 6 | Giant Yellow Intermediate | 39 | 1,035 | 1,317 | 15 | 38 | 560 | 1,276 | .. |
| 7 | Lion Yellow Intermediate | 39 | 540 | 1,309 | .. | 33 | 1,145 | 1,119 | 5 |
| 8 | Selected Mammoth Long Red | 37 | 1,340 | 1,255 | 40 | 34 | 970 | 1,149 | 30 |
| 9 | Giant Sugar | 34 | 1,300 | 1,155 | .. | 37 | 1,340 | 1,255 | 40 |
| 10 | Prize Winner Yellow Globe | 34 | 970 | 1,149 | 30 | 31 | 1,505 | 1,091 | 45 |
| 11 | Giant Yellow Globe | 33 | 1,980 | 1,133 | .. | 28 | 265 | 937 | 25 |
| 12 | Gate Post | 33 | 1,815 | 1,130 | 15 | 36 | 270 | 1,204 | 30 |
| 13 | Prize Mammoth Long Red | 29 | 1,520 | 992 | .. | 27 | 1,440 | 924 | .. |
| 14 | Triumph Yellow Globe | 28 | 1,460 | 957 | 40 | 26 | 1,965 | 899 | 25 |
| 15 | Leviathan Long Red | 27 | 120 | 902 | .. | 31 | 370 | 1,039 | 30 |
| 16 | Yellow Intermediate | 26 | 1,790 | 896 | 30 | 26 | 1,470 | 891 | 10 |

## EXPERIMENTS WITH CARROTS.

Eleven varieties of carrots were tested. Two sowings were made of each sort, in drills thirty inches apart. The first sowing was made April 27, and the second May 11. All were pulled October 27. Four rows of each sort were put in at each sowing, and the yield was reckoned from the produce of 66 feet of the two centre rows of each plot. The land for these plots was similar to that used for the turnips, and its treatment and preparation was the same.

CARROTS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1st Plot. | | | | 2nd Plot. | | | |
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Mammoth White Intermediate | 32 | 1,175 | 1,086 | 15 | 26 | 1,625 | 893 | 45 |
| 2 | Giant Short White Vosges | 31 | 1,690 | 1,061 | 30 | 28 | 430 | 940 | 30 |
| 3 | Improved Short White | 26 | 140 | 869 | .. | 24 | 1,005 | 816 | 45 |
| 4 | Ontario Champion | 25 | 160 | 836 | .. | 25 | 1,480 | 858 | .. |
| 5 | White Belgian | 24 | 1,830 | 830 | 30 | 22 | 220 | 737 | .. |
| 6 | Carter's Orange Giant | 23 | 860 | 781 | .. | 22 | 55 | 734 | 15 |
| 7 | Half Long White | 21 | 570 | 709 | 30 | 22 | 385 | 739 | 45 |
| 8 | Long Yellow Stump Rooted | 20 | 920 | 682 | .. | 18 | 1,290 | 621 | 30 |
| 9 | New White Intermediate | 19 | 940 | 649 | .. | 17 | 1,640 | 594 | .. |
| 10 | Half Long Chantenay | 19 | 610 | 643 | 30 | 17 | 1,310 | 588 | 50 |
| 11 | Early Gem | 18 | 960 | 616 | .. | 18 | 630 | 610 | 30 |

## EXPERIMENTS WITH SUGAR BEETS.

Eight varieties of sugar beets were tested on a mellow sandy loam that was in clover the previous year, was ploughed in September and disc-harrowed and cultivated in the fall and given a dressing of about twenty loads of barn-yard manure per acre during the winter. This was thoroughly worked into the soil in March and April, and the first series of plots sown in drills 30 inches apart on April 28, and the second sowing on May 12. All were harvested October 23. The yields have been computed from the produce of 66 feet of the two centre rows.

SUGAR BEETS—TEST OF VARIETIES.

| Number. | Name of Variety. | Yield per Acre. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1st Plot. | | | | 2nd Plot. | | | |
| | | Tons. | Lbs. | Bush. | Lbs. | Tons. | Lbs. | Bush. | Lbs. |
| 1 | Red Top Sugar | 28 | 1,420 | 957 | .. | 28 | 1,750 | 962 | 30 |
| 2 | Danish Red Top | 27 | 120 | 902 | .. | 25 | 160 | 836 | .. |
| 3 | Improved Imperial | 26 | 800 | 880 | .. | 35 | 390 | 1,173 | 10 |
| 4 | Danish Improved | 26 | 635 | 877 | 15 | 27 | 1,440 | 924 | .. |
| 5 | Royal Giant | 26 | 470 | 874 | 30 | 26 | 800 | 880 | .. |
| 6 | Vilmorin's Improved | 23 | 1,190 | 786 | 30 | 22 | 1,540 | 759 | .. |
| 7 | French 'Very Rich' | 19 | 280 | 638 | .. | 22 | 880 | 748 | .. |
| 8 | Klein Wanzleben | 18 | 960 | 616 | .. | 20 | 590 | 676 | 30 |

## POTATOES.

Fifty-six varieties of potatoes were tested. The soil was a clay loam on which oats and pease were grown in 1902, and which had a crop of clover in 1901. Clover was sown again with the oats and pease in 1902, and a splendid catch resulted which gave a fine mat of growth to turn under for the potatoes. Four rows of each sort, one hundred feet long, were planted May 19. All were sprayed July 6 and again two weeks later, except two test plots left unsprayed. When matured the two centre rows in each case were dug, and the yield per acre computed from the weight of crop obtained from these two rows (66 feet). There was little or no blight this season, and in consequence there was no apparent benefit from the spraying.

POTATOES—TEST OF VARIETIES.

| Number. | Name of Variety. | Total Yield per Acre. | | Yield per Acre of | | | | | | | | Form and Colour. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Sound. | | Rotten. | | Marketable. | | Unmarketable. | | |
| | | Bus. | Lbs. | Bus. | Lbs. | Bus. | Lbs | Bus. | Lbs. | Bus. | Lbs. | |
| 1 | Rochester Rose | 466 | 24 | 466 | 24 | None | ... | 373 | 24 | 93 | .. | Long, rose. |
| 2 | Cambridge Russet | 459 | 48 | 459 | 48 | " | ... | 323 | 32 | 136 | 16 | Oblong, russet. |
| 3 | Reeve's Rose | 400 | 24 | 380 | 24 | 20 | .. | 340 | .. | 40 | 24 | Long, rose. |
| 4 | Country Gentleman | 398 | 12 | 398 | 12 | None. | . | 360 | .. | 38 | 12 | " pink and white. |
| 5 | Vanier | 376 | 12 | 376 | 12 | " | ... | 340 | .. | 36 | 12 | " red. |
| 6 | Early Rose | 375 | 40 | 356 | 40 | 19 | ... | 321 | .. | 35 | 40 | Oblong, rose. |
| 7 | American Wonder | 360 | 48 | 342 | 48 | 18 | ... | 291 | 48 | 51 | .. | Long flat, white. |
| 8 | Early Michigan | 360 | 48 | 326 | .. | 34 | 48 | 361 | .. | 65 | .. | " white. |
| 9 | Rose No. 9 | 358 | 36 | 358 | 36 | None. | . | 305 | 36 | 53 | .. | " rose. |
| 10 | Sharpe's Seedling | 356 | 24 | 356 | 24 | " | ... | 285 | .. | 71 | 24 | " round, rose. |
| 11 | Seedling No. 7 | 347 | 36 | 330 | .. | 17 | 36 | 296 | .. | 34 | .. | " red. |
| 12 | Irish Daisy | 344 | 48 | 329 | .. | 15 | 48 | 263 | 30 | 65 | 30 | Round, white. |
| 13 | Pearce | 344 | 48 | 344 | 48 | None. | . | 274 | .. | 70 | 48 | Long, white and pink. |
| 14 | Sutton's Invincible | 332 | 12 | 316 | .. | 16 | 12 | 253 | .. | 65 | .. | " white. |
| 15 | Dreer's Standard | 323 | 24 | 323 | 24 | None. | . | 273 | 24 | 50 | .. | Oval, white. |
| 16 | Uncle Sam | 321 | 12 | 304 | 12 | 17 | .. | 259 | 12 | 45 | .. | Round, white. |
| 17 | Rawdon Rose | 316 | 48 | 269 | 18 | 47 | 30 | 221 | 18 | 48 | .. | Long, rose. |
| 18 | Brown's Rot-proof | 316 | 48 | 316 | 48 | None. | . | 237 | 48 | 79 | .. | " red. |
| 19 | Prolific Rose | 316 | 48 | 284 | .. | 32 | 48 | 228 | .. | 56 | .. | " rose. |
| 20 | Maule's Thoroughbred | 314 | 36 | 302 | .. | 12 | 36 | 257 | .. | 45 | .. | " " |
| 21 | Swiss Snowflake | 312 | 24 | 312 | 24 | None. | . | 266 | 24 | 46 | .. | " white. |
| 22 | Penn. Manor | 310 | 12 | 294 | 42 | 15 | 30 | 250 | .. | 44 | 42 | " red. |
| 23 | Late Puritan | 299 | 12 | 299 | 12 | None. | . | 210 | 12 | 89 | .. | " white. |
| 24 | Early St. George | 299 | 12 | 284 | 42 | 14 | 33 | 256 | 12 | 28 | 30 | " " |
| 25 | I.X.L. | 293 | 18 | 263 | 18 | 30 | .. | 238 | .. | 25 | 18 | Long, flat, pink. |
| 26 | Carman No. 1 | 292 | 36 | 292 | 36 | None. | . | 234 | .. | 58 | 36 | Round, white. |
| 27 | Irish Cobbler | 290 | 24 | 276 | .. | 14 | 24 | 236 | .. | 40 | .. | " " |
| 28 | Bovee | 286 | .. | 257 | .. | 29 | .. | 219 | .. | 38 | .. | Long, rose. |
| 29 | Green Mountain | 285 | 54 | 285 | 54 | None. | . | 230 | 54 | 55 | .. | " white. |
| 30 | Burnaby Seedling | 281 | 36 | 267 | 36 | 14 | .. | 217 | 36 | 50 | .. | " rose. |
| 31 | Early Norther | 279 | 24 | 267 | .. | 12 | 24 | 227 | 30 | 39 | 30 | " pink. |
| 32 | Troy Seedling | 277 | 12 | 277 | 12 | None | .. | 251 | 12 | 26 | .. | " red. |
| 33 | McIntyre | 275 | .. | 275 | .. | " | ... | 205 | .. | 76 | .. | " pink. |
| 34 | Early White Prize | 268 | 24 | 268 | 24 | " | ... | 214 | 24 | 54 | . | Oblong, white. |
| 35 | Early Puritan | 266 | 12 | 253 | .. | 13 | 12 | 202 | 30 | 50 | 30 | Long, white. |
| 36 | State of Maine | 261 | 48 | 261 | 48 | None | .. | 209 | 48 | 52 | .. | " pink. |
| 37 | Holborn Abundance | 257 | 24 | 257 | 24 | " | .. | 206 | .. | 51 | 24 | Round, white. |
| 38 | Delaware | 253 | .. | 253 | .. | " | .. | 190 | .. | 63 | .. | " " |
| 39 | Early Sunrise | 248 | 36 | 224 | .. | 24 | 36 | 179 | .. | 45 | .. | Long, rose. |
| 40 | Enormous | 244 | 12 | 244 | 12 | None | .. | 194 | 12 | 50 | .. | " white. |
| 41 | Vick's Extra Early | 242 | .. | 242 | .. | " | .. | 181 | .. | 61 | .. | Round, pale rose. |
| 42 | Money Maker | 239 | 48 | 239 | 48 | " | .. | 190 | .. | 49 | 48 | Long, white. |
| 43 | Everett | 236 | 20 | 189 | 30 | 47 | .. | 141 | 54 | 47 | 18 | " round, red. |
| 44 | Burpee's Extra Early | 234 | 18 | 234 | 18 | None | .. | 175 | 30 | 58 | 48 | " rose. |
| 45 | Early Andes | 233 | 12 | 209 | 12 | 24 | .. | 177 | 12 | 32 | .. | Round, rose. |
| 46 | Clay Rose | 232 | 6 | 232 | 6 | None | .. | 185 | 36 | 46 | 30 | Long, rose. |
| 47 | Canadian Beauty | 231 | .. | 231 | .. | " | .. | 172 | 30 | 58 | 30 | " flat, pink. |
| 48 | Sutton's Supreme | 228 | 48 | 228 | 48 | " | .. | 171 | 18 | 57 | 30 | " white. |
| 49 | Early Envoy | 226 | 36 | 226 | 36 | " | .. | 181 | 18 | 45 | 18 | " pink and white. |
| 50 | Sabean's Elephant | 211 | 12 | 200 | 42 | 10 | 30 | 166 | 42 | 34 | .. | " flat, white. |
| 51 | Lee's Favourite | 200 | 12 | 200 | 12 | None | .. | 160 | 12 | 40 | .. | " rose. |
| 52 | Carman No. 3 | 195 | 48 | 186 | .. | 9 | 48 | 149 | 30 | 37 | 30 | Oblong, white. |
| 53 | General Gordon | 193 | 36 | 193 | 36 | None | .. | 135 | 36 | 58 | .. | Oval, pink. |
| 54 | American Giant | 189 | 12 | 189 | 12 | . | .. | 161 | 12 | 28 | .. | Long, white. |
| 55 | Empire State | 183 | 44 | 165 | 14 | 18 | 30 | 132 | 14 | 33 | .. | " pink and white. |
| 56 | Up to Date | 140 | 48 | 140 | 48 | None | .. | 105 | 48 | 35 | .. | Oval, white. |

### FERTILIZERS APPLIED TO POTATOES.

The land chosen for these plots was similar to that for the main crop of potatoes, having had clover turned under both of the two preceding years, and consequently the soil was well supplied with nitrogen. Early in the spring it received a dressing of muriate of potash at the rate of 100 lbs. per acre. All the plots were planted the same day and were treated alike in every way. The results show a decided profit in the use of the Thomas' slag.

### POTATOES—FERTILIZER TEST.

| Name of Variety. | Fertilizer applied. | Planted. | Dug. | Total Yield per Acre. | Yield per Acre of Sound. | Yield per Acre of Rotten. | Yield per Acre of Marketable. | Yield per Acre of Unmarketable. |
|---|---|---|---|---|---|---|---|---|
| | | | | Bus. lbs. | Bus. lbs. | Bus. lbs. | Bus. lbs. | Bus. lbs. |
| Dakota Red. | Thomas slag, 100 lbs. per acre. | May 19. | Sept. 28. | 589 36 | 589 36 | None... | 501 .. | 88 36 |
| " . | " 150 " .. | " 19. | " 28. | 618 12 | 618 12 | " ... | 525 30 | 92 42 |
| " . | " 200 " .. | " 19. | " 28. | 686 24 | 686 24 | " ... | 584 .. | 102 24 |
| " . | Untreated.................. | " 19. | " 28. | 468 36 | 468 36 | " ... | 398 21 | 70 15 |

## SUMMARY OF CROPS.

The following is a summary of the grain, roots and fodder crops raised on the Experimental Farm at Agassiz this season:—

| | Tons. | Lbs. |
|---|---|---|
| Hay.................................... | 53 | 1,000 |
| Corn for silage and fed green.............. | 110 | .. |
| Turnips.................................. | 42 | .. |
| Mangels.................................. | 25 | .. |
| Carrots.................................. | 8 | .. |
| Sugar beets.............................. | 5 | .. |
| Oats..................................... | 11 | 1,500 |
| Pease.................................... | 4 | 1,000 |
| Wheat.................................... | 2 | 500 |
| Barley................................... | 2 | 1,700 |
| Potatoes................................. | 5 | .. |
| Total.................................... | 269 | 1,700 |

## FODDER PLANTS.

The following fodder plants were tested this year, all on plots of one-fortieth of an acre each. None of the millets appear to be very successful here, and it is always practicable to get heavier yields of mixed grains, such as oats and pease, or oats and vetches, than of any of the millets, and the mixed grains are eaten as readily as are the millets, and the results of their feeding are more satisfactory.

### EXPERIMENTS WITH MILLETS.

Plots 1 to 6 inclusive were sown May 21 and cut September 1.

Plot 1.—White Round Extra French:—

Stalks 30 to 36 inches long and not leafy, heads 2 to 2½ inches long; yield per acre when cut, 3 tons 1,920 lbs.

Plot 2.—Red Orenburg.

A poor uneven crop; stalks 30 to 48 inches long and not leafy; heads 2½ to 3 inches long; weight when cut, 3 tons 960 lbs. per acre.

Plot 3.—Cat-tail Millet:—

Not an even crop; stalks 30 to 36 inches long and moderately leafy; heads 3 to 4 inches; weight when cut, 3 tons 640 lbs. per acre.

Plot 4.—Italian Millet:—

Stalks 32 to 40 inches long; heads 4 to 5 inches long; weight when cut, 3 tons 1,360 lbs. per acre.

Plot 5.—Pearl Millet:—

A poor uneven stand; stalks 36 to 50 inches long and very few leaves; heads 2 to 3 inches long; weight when cut, 3 tons 1,840 lbs. per acre.

Plot 6.—Hungarian Grass:—

A fair even stand and moderately leafy, but short in head and stalk; stalk 24 to 30 inches long and heads 3 to 5 inches; weight when cut, 3 tons 1,280 lbs. per acre.

### EXPERIMENTS WITH MIXED GRAIN.

Plot 7.—Oats, Tares and Wheat mixed:—

Sown May 21 and cut September 1; an even luxuriant growth; cut when the oats were in the dough stage; weight when cut, 9 tons 1,460 lbs.

Plots 8 to 15 were sown May 7, and cut September 30.

### EXPERIMENTS WITH SOJA BEANS.

Plot 8.—Soja Beans:—

Sown in drills 21 inches apart; an even stand and fairly well podded; pods 1 to 1½ inches long, very leafy; length of stalk, 30 inches; yield per acre weighed when cut, 4 tons 200 lbs. per acre.

Plot 9.—Soja Beans:—

Sown in drills 28 inches apart, well podded, very leafy and well branched; stalks 30 inches long; weight when cut, 4 tons 1,200 lbs. per acre.

Plot 10.—Soja Beans:—

Sown in drills 35 inches apart; very branchy and leafy, pods 1 to 1¼ inches long and fairly plentiful; stalks 28 inches long; weight when cut, 4 tons 400 lbs. per acre.

### EXPERIMENTS WITH HORSE BEANS.

Plot 11.—Horse Beans:—

Sown in drills 21 inches apart; a very patchy stand; pods short and few on the stalk; stalks about 24 inches long; weight when cut, 2 tons 1,440 lbs. per acre.

Plot 12.—Horse Beans:—

Sown in drills 28 inches apart; stalks 30 inches long and poorly furnished with pods; weight when cut, 2 tons 1,600 lbs. per acre.

Plot 13.—Horse Beans:—

Sown in drills 35 inches apart; stalks 32 inches long; pods short and not well filled; weight when cut, 2 tons 1,280 lbs. per acre.

### *Velvet Beans.*

Plot 14.—Velvet Beans:—

Sown in drills 18 inches apart; very few of the seeds germinated, and none grew more than 2 inches and shortly died; not hardy enough for this climate.

### *Cow Peas.*

Plot 15.—Whip-poor-will Cow Peas:—

Sown in drills 18 inches apart; made a weak straggling growth of not more than 6 inches; produced no crop worth mentioning.

### SUNFLOWERS.

A plot of the Mammoth Russian Sunflowers were sown May 7 in drills three feet apart. They grew very vigorously and made very fine heads. The birds began to eat the seed as soon as it was full grown, and were very destructive. The seed is valuable for poultry.

## EXPERIMENTS WITH FLAX.

Two varieties of flax were sown for seed May 7.

Improved Russian. Straw 36 inches long and very branching; yield of clean flax 14 bushels and 23 lbs. per acre. Harvested August 10.

Early Riga. Straw 34 to 38 inches long, not as well branched as Improved Russian and not as good a yield of seed. Ripe August 10; yield, 12 bushels and 8 lbs. per acre.

## GARDEN VEGETABLES.

### RADISHES.—Sown April 16.

| Variety. | Fit for use. | Remarks. |
|---|---|---|
| Early Scarlet Turnip | May 10 | Crisp, pleasant. |
| Olive Shaped Scarlet | " 16 | Crisp, good. |
| French Breakfast | " 22 | Very sweet and crisp. |

### LETTUCE.—Sown April 16.

| Variety. | Fit for use. | Remarks. |
|---|---|---|
| Grand Rapids | May 14 | Crisp, tender. |
| Ohio Cabbage | " 18 | Crisp, tender, sweet. |
| Black Seeded Simpson | " 20 | Very crisp and good. |
| Toronto Gem | " 28 | Firm, sweet, crisp. |
| All The Year Round | " 30 | White, solid, sweet. |

### CARROTS.—Sown April 16.

| Variety. | Fit for use. | Remarks. |
|---|---|---|
| Parisian Forcing | June 18 | Crisp, sweet, good. |
| French Horn | " 22 | Very fine flavoured. |
| Luc Half Long | July 10 | Crisp, sweet, pleasant. |
| Long Blood Red | " 18 | Crisp, very good. |
| Half Long Danvers | Aug. 8 | Very fine. |

### TABLE TURNIPS.—Sown May 1.

| Variety. | Fit for use. | Remarks. |
|---|---|---|
| Extra Early White Milan | June 16 | Very sweet and good. |
| White Six Weeks | " 20 | Sweet, fine flavour. |
| Red Top Strap Leaf | " 29 | Crisp, good. |
| White Stone | July 8 | Very solid, crisp. |
| Robertson's Golden Ball | " 14 | Very fine flavour. |
| Hazard's Swede | Aug. — | Very sweet, crisp, good. |

### ONIONS.—Sown April 17.

| Variety. | Remarks. |
|---|---|
| Early White Welsh | Uniform size, firm, mild, good flavour. |
| Large Red Wethersfield | Medium, large, solid good. |
| Danvers Yellow | Flat, medium size, solid. |
| Market Favourite | An even regular grower, mild, good flavour. |
| Trebons Large Yellow | Large, handsome, solid, mild. |
| Paris Silver Skin | Very handsome, fine flavour. |

### CABBAGE.—Sown in hot-bed April 20, and transplanted May 26.

| Variety. | Fit for Table | Remarks. |
|---|---|---|
| Jersey Wakefield | July 18 | Heads solid, crisp, white; a uniform header. |
| Extra Early Express | " 24 | Heads small, firm, good quality, an even header. |
| Extra Early Midsummer Savoy | " 28 | Heads soft but flavour very fine, extra quality. |
| Paris Market | " 30 | Variable in size and firmness, quality good. |
| Early Winningstadt | Aug. 20 | A very nice header; heads uniform in size, firm, white, sweet, quality good. |
| Drumhead Savoy | " 26 | Heads medium size, solid, white, extra fine flavour. |
| Mammoth Red Rock | " 28 | A good header: heads medium size, solid, very red, good. |
| Green Globe Savoy | Sept. 10 | A regular header; heads of medium size, solid, crisp, fine flavour. |
| Glory of Enkhousen | Oct. — | A regular header, heads large, solid, very crisp and sweet. |
| Fottler's Drumhead | " — | Heads, large, solid, white, good quality; good keeper. |
| Fielder Kraut | " — | A fine, medium head, solid, white, sweet. |
| Lupton | " — | A regular header; heads large, solid, good |
| Quintal Drumhead | " — | Heads large, solid, white, fine quality. |
| Danish Ball Head | " — | Heads medium size, very solid, sweet and of fine flavour; a good keeper. |
| Zenith | Oct. — | A regular header, head of medium size; solid, tender, fine quality, very good. |
| Marblehead Mammoth | " — | Heads large, but sometimes soft; quality medium. |
| Large Red Drumhead | " — | A fairly regular header; heads very solid, deep red, tender, good. |

### CAULIFLOWER.—Sown April 20 and transplanted May 26.

| | | |
|---|---|---|
| Extra Early Snowflake | Aug. 4 | Heads large, solid, crisp, very white, good. |
| Extra Early Dwarf | July 28 | Heads medium to large, solid, crisp, sweet, very fine. |
| Half Early Paris | " 24 | Heads small, crisp, of good flavour, very fine. |

### BROCOLI.—Sown April 20 and transplanted May 26.

| | | |
|---|---|---|
| Extra Early White | Aug, 20 | Heads firm, of medium size, white, crisp, fine flavour. |

### BRUSSELS SPROUTS.—Sown April 20 and transplanted May 26.

| | | |
|---|---|---|
| Dwarf Improved | Oct. 24 | Sprouts solid, crisp, sweet, very good. |

## BEETS.—Sown May 1.

| Name. | Fit for use. | Remarks. |
|---|---|---|
| Egyptian | July 9 | Solid, very dark red, sweet. |
| Nutting's Dark Red | 〃 18 | Good size, very dark red. |
| Edmands Early Blood Turnip | 〃 18 | Sweet, good, very even sized, good colour, pleasant. |
| Long Smooth Blood | Aug. 28 | Smooth, long, sweet, very dark red, very good. |

## BEANS.—Planted May 1.

| | | |
|---|---|---|
| Early Mohawk | July 10 | Dwarf grower, but very productive; pods 4 to 5 in. long, crisp, pleasant flavour. |
| Dwarf Golden Skinless | 〃 13 | A dwarf grower, but very productive; pods $2\frac{1}{2}$ to 4 in. long, crisp, stringless and good. |
| Early China | 〃 13 | A very dwarf grower, productive; pods 4 to 5 in. long, of a pleasant flavour. |
| Extra Early Edible Podded | 〃 15 | Dwarf grower, productive, good flavour; pods 4 to 5 in. long. |
| Royal Dwarf Kidney | 〃 16 | A bushy grower, fairly productive and of a pleasant flavour. |
| Long Yellow Six Weeks | 〃 18 | A bushy grower, productive; pods 3 to 5 in. long, crisp, pleasant, good. |
| Improved Early Red Valentine | 〃 19 | A strong bushy grower and productive; pods 3 to 5 in. long and of very fine flavour. |
| Crystal White Wax | 〃 19 | A bushy grower, fairly productive; pods plump, crisp, 4 to 5 in. long with a very pleasant flavour. |
| Fame of Vitry | 〃 20 | A strong grower, productive; 4 to 6 in. long, crisp, tender, sweet, pleasant, good. |
| Dwarf, Emperor of Russia | 〃 20 | A bushy strong grower, very productive; pods 4 to 5 in. long, crisp, and of very fine flavour. |
| Dwarf, Inexhaustable | 〃 22 | Very dwarf, bushy, productive; pods 3 to 5 in. long; crisp very pleasant, good. |
| Dwarf, Black Speckled | 〃 24 | Dwarf, bushy, productive; pods 4 to 6 in. long; fleshy, crisp, juicy with a very pleasant flavour. |

## GARDEN PEASE.—Sown April 16.

| | | |
|---|---|---|
| Nott's Excelsior | June 21 | Vines 16 in. long, well podded; pods 2 to $2\frac{1}{2}$ in. long and well filled, peas sweet and tender. |
| Alaska | 〃 21 | Vines 24 in., well podded; pods $2\frac{1}{2}$ to $3\frac{1}{2}$ in. long and well filled with medium sized peas of fine quality. |
| American Wonder | 〃 24 | Vines 14 to 18 in. long, well podded; pods 2 to 3 in. long and filled with medium sized sweet tender peas. |
| Premium Gem | 〃 30 | Vines 20 to 24 in. and very well furnished pods 2 to 3 in. long, pea of medium size, sweet and tender with a pleasant flavour. |
| Sutton's May Queen | July 3 | Vines 24 to 30 in., fairly well podded; pods 2 to 3 in. long, well filled, pea of medium size, quality good. |
| McLean's Advancer | 〃 5 | Vines 26 to 30 in. long and fairly well loaded; pods 3 to $3\frac{1}{2}$ in. long, well filled with medium size peas tender and sweet and of very fine quality. |
| Heroine | 〃 8 | Vines 20 to 24 in. long, pods 3 in. long well filled, peas large, sweet, tender and of very fine flavour. |
| Gradus | 〃 8 | Vines 30 to 36 in. long and well podded; pods $3\frac{1}{2}$ to 5 in. long and filled with large peas sweet and of superior flavour. |
| Sutton's Conqueror | 〃 9 | Vines 2 ft. long, well loaded with pods of 3 to 5 in. long, peas large, sweet and of very fine quality. |
| Duke of Albany | 〃 10 | Vines 30 to 36 in. long, well furnished with pods $2\frac{1}{2}$ to $3\frac{1}{2}$ in. long containing medium sized very sweet fine flavoured peas. |
| Admiral | 〃 11 | Vines 3 to $3\frac{1}{2}$ ft. long, very well podded; pods $2\frac{1}{2}$ to $3\frac{1}{2}$ in. long, well filled with large peas of very fine quality. |
| Rent Payer | 〃 11 | Vines 24 to 30 in. long, well loaded with pods 4 to 5 in. long, pea large, sweet, tender, very good. |
| New Dwarf Telephone | 〃 18 | Vines 18 in. long, very productive; pods 3 to $3\frac{1}{2}$ in. long, pea large, sweet, tender and of fine flavour. |

## GARDEN PEAS—Sown April 16.

| Name. | Fit for use. | Remarks. |
|---|---|---|
| Pride of the Market | July 12 | Vines 18 in. to 2 ft. long and fairly productive; pods 2 to 3½ in. long, well filled with medium sized peas of fine quality. |
| Stratagem | " 13 | Vines 18 to 24 in. and well podded, pods 3 to 4 in. long, pea large, sweet and of very fine quality. |
| Shropshire Hero | " 13 | Vines vigorous and 2½ to 3 ft. long, productive, pods 2½ to 4 in. long, well filled with large peas of very superior flavour. |
| Horsford's Market Garden | " 13 | Vines 2 to 2½ ft. long, vigorous and productive, pods 2 to 3 in. long, peas of medium size and very fair quality. |
| Sutton's Perfection | " 13 | Vines stout and 1½ to 2 ft. long, productive, pods long and well filled with 6 to 10 large peas of good quality. |
| Sutton's Windsor Castle | " 15 | Vines 2 to 2½ ft. long, moderately productive, pods 3 to 4½ in. long, peas large, sweet, tender and of very fine flavour. |
| Sutton's Matchless Marrow | " 15 | Vines 1½ ft. to 2 ft. long, well podded, pods 3 to 4 in. long, peas large sweet and of pleasant flavour. |
| Sutton's Late Queen | " 22 | Vines 15 to 18 inches long, well furnished with large pods containing 6 to 10 very large sweet tender peas of first quality. |
| Telephone | " 22 | Vines 2 to 2½ ft. long well podded, pods 2 to 3 in. long and well filled with large sweet peas of very fine flavour. |

## KOHL RABI—Sown May 10.

| | | |
|---|---|---|
| White Goliath | July 22 | Crisp, sweet, mild and of pleasant flavour. |

## SQUASH—Planted May 2.

| | | |
|---|---|---|
| Golden Bush | July 29 | Productive, sweet and of pleasant flavour. |
| Bush Fordhook | Aug. 8 | A vigorous grower and very productive, fruit small, solid, very thick fleshed and very fine in flavour. |
| English Vegetable Marrow | July 30 | A strong grower and productive, very fine flavour, fit for table July 30. |
| Delicata | Sept. to Jan. | Vines strong growers and very productive, squash 9 to 11 in. long and 3½ in. in diameter, very thick, flesh of the finest quality. |

| Name. | Remarks. |
|---|---|
| Boston Marrow | A vigorous grower and productive. Thick fleshed, sweet, dry, of fine flavour. Fit for table September 4. |
| Essex Hybrid | Vines vigorous and very productive. Flesh fine grained, sweet and of a fine flavour. Fit for table September 10. |
| Pike's Peak | A very strong grower and very productive. Very solid, flesh dry, sweet, fine-grained, good. Fit for use September 10. |
| Golden Bronze | Vine a strong grower and productive. Squash medium size, very thick fleshed. Flesh very sweet, fine-grained, dry and of extra fine flavour. Season September. |
| Marble-head | Vines vigorous and productive. Squash solid, thick fleshed, sweet, fine-grained and of very fine flavour. Season, September. |
| Chicago Warted Hubbard | Vines productive. Flesh very thick, sweet, fine-grained and of fine flavour. Season, September. |

## SWEET CORN.—Planted May 1.

| | |
|---|---|
| Early Minnesota | Stalks 4½ to 5 feet high, often two good ears on a stalk. Fit for table August 23. Ears 4 to 6 inches long, well filled, corn sweet and fine flavoured. |
| Early Crosby | Stalks 5 feet high and fairly productive. Fit for table August 26. Ears rather small but very well filled with very sweet, fine flavoured corn. |

## SAMPLES DISTRIBUTED.

It is gratifying to observe the increase in the interest taken in the work of the farm. This is evident from the increase in the correspondence and the large number of requests for seed grain, nuts and other tree seeds, as well as for scions of fruit trees.

| | |
|---|---|
| Packages of scions and cuttings | 384 |
| 3 lb. samples of potatoes | 310 |
| 3 " oats | 163 |
| 3 " pease | 148 |
| 3 " wheat | 217 |
| 3 " barley | 128 |
| Nut and tree seeds, bulbs, &c | 213 |
| Total | 1,563 |

## CORRESPONDENCE.

Number of letters received, 2,767; number of letters sent out, 2,570.

## APPLES.

The season in the spring was unfavourable. The weather was cold and showery, and although the trees were full of bloom, many varieties did not set fruit, and the crop has been light in most cases. The quality, however, was better and the fruit freer from scab than in previous years. The following new varieties fruited for the first time this year :—

1. *James Welch.* Tree a strong grower. Fruit large, oblong, conical. Stalk short, cavity narrow and shallow, calyx small, basin narrow, shallow and ribbed. Skin pale yellowish green, with many grey dots sprinkled over the whole surface. Flesh coarse, white, not juicy, sharply acid. A good cooking apple. Season August.

2. *Summer Rose.*—Tree a slow grower. Fruit small, round. Stalk medium in length, slender. Calyx small, closed. Basin smooth, medium, deep and wide. Skin clear yellow, with a bright red cheek. Flesh white, tender, juicy, sprightly, with a very pleasant flavour. Season August.

3. *Sweet Russet.*—Tree a strong grower. Fruit small, oblate. Stem long and slender. Cavity wide and deep. Calyx closed. Basin wide and shallow. Skin russet, with a russet red cheek. Flesh white, moderately juicy, sweet and pleasant. Season September.

4. *Reine des Pommes.*—Tree a moderate grower. Fruit of medium size, conical. Stalk short, slender. Cavity deep and narrow. Calyx small, closed. Basin narrow and shallow. Skin pale yellow, striped with bright red. Flesh white, crisp, fine-grained, pleasant, sprightly, acid, of good flavour. Season August.

5. *Avista.*—Tree a strong grower. Fruit of medium size, roundish oblate. Stalk medium in length and slender. Cavity round and shallow. Calyx large, closed. Basin wide and shallow. Skin yellowish white, striped and splashed with bright red. Flesh white, firm, crisp, juicy, pleasant and sub-acid. Season early September.

6. *Yorkshire Greening.*—Tree a strong grower. Fruit above medium size, oblate, somewhat ribbed. Stem short. Cavity small. Calyx medium, open. Basin shallow. Skin greenish yellow, with stripes of dull red and small patches of russet. Flesh yellowish white, firm, crisp, moderately juicy, sub-acid. Season early.

7. *Kerry Pippin.*—Tree a vigorous grower. Fruit of medium size, roundish, oblong. Stalk long and slender. Cavity small. Calyx small, closed. Basin small. Skin pale yellow, with sometimes a faint blush in the sun. Flesh yellowish, tender, crisp, moderately juicy, rich, sugary, with a pleasant flavour Season October.

8. *Golden Spire.*—Tree a moderate grower. Fruit of medium size, oblong, conical, somewhat ribbed. Stem short, slender. Cavity deep and narrow. Calyx large, closed. Basin shallow, narrow and ribbed. Skin bright golden yellow, occasionally with a blush on the sunny side. Flesh white, juicy, tender, mild and pleasantly acid. Season September.

9. *Steward.*—Tree a poor grower. Fruit of medium size, globular. Stem short. Cavity very small and shallow. Calyx large and open. Basin wide and deep. Skin greenish yellow, with red stripes on sunny side. Flesh white, crisp juicy, nearly sweet, with a pleasant flavour. Season September.

10. *Gold Ridge Seedling.*—Tree a free grower. Fruit below medium size, roundish, oblate. Stem long, slender. Cavity medium to large. Calyx small, closed. Basin narrow and shallow. Skin dull, greenish yellow, with sometimes a faint blush. Flesh white, crisp. juicy, pleasantly sub-acid. Season September.

11. *Winter Golden.*—Tree a vigorous grower. Fruit medium to small, roundish, oblate. Stem slender. Cavity narrow and deep. Calyx small, closed. Basin narrow and of medium depth. Skin clear golden yellow, with sometimes a faint blush in the sun. Flesh yelowish white, moderately juicy, sweet and of pleasant flavour. Season September.

12. *Northern Dumpling.*—Tree a vigorous grower. Fruit above medium size, conical, ribbed. Stalk short, cavity small, calyx medium and closed. Basin deep and corrugated. Skin yellowish white, nearly overspread with dull red and sprinkled with small russet dots. Flesh white, crisp, juicy, sprightly with a pleasant flavour. Season October.

13. *Looker Winter.*—Tree a vigorous grower. Fruit medium to small, globular. Stalk short and slender. Cavity small. Calyx large, closed. Basin wide, shallow and corrugated. Skin yellow with stripes and splashes of deep red. Flesh yellowish, crisp, mildly sub-acid. Season October.

14. *Brierly Wood.*—Tree a strong grower. Fruit small to medium, globular. Stem short. Cavity deep and narrow. Calyx small, closed. Basin deep and narrow. Skin russet yellow, with a faint reddish blush in the sun and sprinkled with russet dots. Flesh white, tender, a little granular, moderately juicy, mildly sub-acid with a pleasant flavour. Season October.

15. *President de Fays du Monceau.*—Tree a vigorous grower. Fruit large, oblate, a little conic. Stalk short, slender. Cavity small. Calyx closed. Basin narrow and deep. Skin yellow with a little red in the sun. Flesh yellowish white, crisp, tender, mild, nearly sweet. Season October and November.

16. *Imperial.*—Tree a moderate grower. Fruit of medium size, conical. Stalk medium. Cavity shallow and wide. Calyx medium and closed. Basin shallow. Skin greenish yellow, striped with dull red. Flesh white, juicy, tender and pleasantly sub-acid. Season October and November.

17. *Clarke's Pearmain.*—Tree a strong grower. Fruit medium or below, roundish oblate, slightly conical. Stalk short. Cavity small. Calyx small, closed. Basin small. Skin greenish yellow, nearly covered with dull red and many russet dots. Flesh yellow, firm, crisp, sweet and pleasant. Season November.

18. *Calville de Maussion.*—Tree a vigorous grower. Fruit of medium size. Stalk short. Cavity deep and wide. Calyx small, closed. Basin small and corrugated. Skin yellowish with a faint blush on sunny side. Flesh white, crisp, juicy, sprightly, pleasant. Season November.

19. *Hoary Morning.*—Tree a strong grower. Fruit large, flattish, conic. Stalk short. Cavity deep and wide. Calyx small, closed. Basin small. Skin pale yellowish green splashed with red, and with a thin white bloom. Flesh white, firm and briskly sub-acid. Season November.

20. *Friandise.*—Tree a vigorous grower. Fruit of medium size, oblong, oval. Stem short. Cavity small. Calyx small, closed. Basin narrow and shallow. Skin green, nearly covered with stripes and splashes of dull red, and a few small patches of russet. Flesh white, firm, juicy and pleasantly sub-acid. Season November and December.

21. *Cornish Gilliflower.*—Tree a strong grower. Fruit of medium size, roundish, conical. Stalk short. Cavity narrow and shallow. Calyx small, closed. Basin narrow and shallow and plaited. Skin greenish yellow, nearly covered with red. Flesh yellowish, tender, moderately juicy, aromatic and pleasantly sub-acid. Season November.

22. *Ash-leaved Reinette.*—Tree a vigorous grower. Fruit of medium size or below medium, roundish, conical. Stem short, slender. Cavity deep and narrow. Calyx small, closed. Basin small. Skin yellowish, with a bright red cheek in the sun. Flesh yellowish, firm, crisp, moderately juicy, pleasantly sub-acid. Season November.

23. *Forfar Pippin.*—Tree a vigorous grower. Fruit medium to large, roundish, globular, ribbed. Stem long. Cavity deep and wide. Calyx large, with an open basin, wide, shallow and corrugated. Skin dull greenish yellow, liable to be scabby. Flesh yellowish, firm, crisp, sprightly. Season November and December.

24. *De Sermoise.*—Tree a feeble grower. Fruit of medium size, globular, slightly conical. Stem short. Cavity medium. Calyx small, closed. Basin wide and shallow. Skin greenish yellow, striped with deep red. Flesh white, crisp, firm, juicy and of a pleasant flavour, mildly sub-acid. Season December.

25. *Castle Major.*—Tree a slow grower. Fruit of medium size, oblate, conical. Stem short. Cavity medium to small. Calyx small, closed. Basin small. Skin greenish yellow, with a dull red cheek and sprinkled with whitish dots. Flesh firm, juicy and briskly acid. Season December.

26. *Wm. Penn.*—Tree a moderate grower. Fruit small, round, flat. Stem short. Cavity deep and narrow, a little russeted. Calyx small, closed. Basin wide, shallow, corrugated. Skin yellow, with a red cheek. Flesh yellowish, crisp, juicy, sub-acid, with a pleasant flavour. Season December.

27. *Reinette Titus.*—Tree a moderate grower. Fruit above medium size, globular. Stem short. Cavity deep and narrow. Calyx small, closed. Basin narrow. Skin greenish yellow, with considerable russet about the stem, and a bronze red cheek, sprinkled with light dots. Flesh firm, yellowish, juicy, a mild pleasant acid. Season December.

28. *Shackleford.*—Tree a strong grower. Fruit of medium size, conical. Stem of medium length. Cavity moderately deep and wide. Calyx small, open. Basin wide and shallow. Skin yellow, with stripes and splashes of red in two shades. Flesh white, crisp, tender, juicy, mildly sub-acid, with a pleasant flavour. Season December.

29. *Reinette Gris du Portugal.*—Tree a strong grower. Fruit of medium size, oblate. Stalk short. Cavity wide and shallow. Calyx small, closed. Basin narrow and deep. Skin a russet brown, with many dots. Flesh firm, juicy, mildly acid, with a pleasant flavour. Season December.

30. *Reinette de Madère.*—Tree a strong grower. Fruit of medium size, conical. Stalk short. Cavity narrow and shallow. Calyx small, closed. Basin narrow and moderately deep, corrugated. Skin dull russet green, with a little russet about the stalk. Season January.

31. *Green Reinette.*—Tree a strong grower. Fruit below medium size, oblate, flattened at stem. Stem short. Cavity narrow and shallow. Calyx small, closed. Basin shallow and narrow. Skin yellowish with a bronze red cheek and a little ribbed about calyx. Season January.

32. *Duke of York.*—Tree a poor grower. Fruit of medium size, oblate. Stem moderately long. Cavity wide and deep. Calyx large and open. Basin wide and shallow. Skin green, striped and splashed with dull red and a few grey specks. Flesh crisp, white, juicy and pleasantly acid. Season winter.

33. *American Beauty.*—Tree a strong grower. Fruit of medium size, roundish inclining to conic. Stalk of medium length and slender. Cavity medium, with russet. Calyx small, closed. Basin of medium depth. Skin yellow, nearly covered with dark red. Flesh white, juicy, mildly sub-acid, with a pleasant slightly aromatic flavour. Season winter.

34. *Bow Hill Pippin.*—Tree a medium grower. Fruit of medium size, globular, slightly angular. Stem short. Cavity narrow, shallow. Calyx closed. Basin wide and deep. Skin greenish yellow, with a brownish red cheek and a few grey dots. Flesh crisp, white and mildly acid. Season winter.

35. *Calville Rose.*—Tree a strong grower. Fruit of medium size, oblong, conical and ribbed. Stalk short. Cavity deep and wide. Calyx closed. Basin narrow and shallow and deeply corrugated. Skin yellow with a dull red cheek. Season late winter.

36. *Reinette Tardive.*—Tree a strong grower. Fruit of medium size, oblate, conical. Stem short. Cavity small. Calyx small, closed. Basin narrow and flat, slightly corrugated. Skin yellow, with a brownish red cheek and many grey dots. Season late winter.

37. *Reinette de Breda.*—Tree a strong grower. Fruit of medium size, oblate, conical, a little angular. Stem short. Cavity narrow and shallow. Calyx large, open. Basin wide and shallow, somewhat corrugated. Skin greenish yellow, with a red blush and sprinkled freely with grey dots. Season late winter.

38. *Grillot.*—Tree a vigorous grower. Fruit small, oblong, globular. Stem long. Cavity wide and deep. Calyx large, open. Basin wide and deep. Skin golden yellow, with a warm blush. Season late winter.

39. *Grande Breitache.*—Tree a strong grower. Fruit of medium size, oblate. Stem short. Cavity shallow. Calyx closed. Basin wide and shallow. Skin yellow, with pale red streaks and splashes and a few dark brown specks, inclined to be scabby. Season late winter.

40. *Reinette de Willy.*—Tree a strong grower. Fruit above medium size, oblate, a little angular. Stem long. Cavity deep and wide. Calyx large, closed. Basin wide, shallow and corrugated. Skin greenish yellow, with a faint blush on sunny side and sprinkled with white dots. Season late winter.

41. *Reinette de la Rochblin.*—Tree a strong grower. Fruit medium to large, globular. Stem short. Cavity narrow and deep. Calyx small, closed. Basin wide and deep. Skin russet green, with a reddish brown cheek, and a few gray dots. Season late winter.

42. *Bayard.*—Tree a vigorous grower. Fruit large, conical. Stem short. Cavity narrow and deep. Calyx small, closed. Basin deep and narrow. Skin yellow, with a small blush, a little reddish russet about the calyx and a few white dots. Season late winter.

43. *Golden Queen.*—Tree a strong upright grower. Fruit small, conical. Stem short. Cavity small. Calyx small, closed. Basin narrow and shallow. Skin golden yellow, with a red cheek and sprinkled with white dots. Season late winter.

44. *Reinette de Damason.*—Tree a moderate grower. Fruit small, roundish, oblate. Stem long, slender. Cavity small. Calyx small, closed. Basin shallow and narrow. Skin bronze russet, with a red cheek. Season winter.

45. *Oelkofen Pippin.*—Tree a feeble grower. Fruit small, round flat. Stem short. Cavity narrow and deep. Calyx large, open. Basin wide and shallow. Skin golden yellow, nearly overspread with deep red. Season winter.

46. *Ohio Nonpareil.*—Tree a medium grower. Fruit large, roundish, oblate. Stem short. Cavity small. Calyx medium and open. Basin narrow and deep. Skin clear yellow, with a bright, clear red cheek. Season winter.

47. *Greaves' Pippin.*—Tree a feeble grower. Fruit of medium size, roundish, oblate, ribbed, somewhat angular. Stem short. Cavity medium, deep and wide. Calyx medium, closed. Basin wide and shallow. Skin dull yellow, with a few russet dots. Season winter.

48. *Poorhouse.*—Tree a strong grower. Fruit above medium size, roundish, oblate, a little conical. Stem short and stout. Cavity moderately deep and wide. Calyx large, partly open. Basin small. Skin yellow, with a faint blush in the sun and a few russet dots. Season late winter.

49. *Nero.*—Tree a strong upright grower. Fruit below medium size, roundish, oblate. Stalk slender and short. Cavity narrow and shallow. Calyx small, closed. Basin wide, flat and corrugated. Skin yellowish white, nearly covered with bright red russet in cavity about stem, and a few yellowish dots. Season winter.

## PEARS.

The pear trees made a strong healthy growth in 1902, and were very full of bloom this spring, but the weather was cold and wet all the time of blossoming, and the fruit failed to set. A few varieties bore good crops, but a few specimens were the rule on most trees and no fruit at all on many varieties. Bartlett, La France, Dr. Jules Guyot, Clairgeau, Bosc and Emile de Heyst gave fair crops. The Emile de Heyst is one of the most satisfactory of the late autumn pears, being a reliable cropper and of very fine quality.

The following new sorts fruited for the first time:—

1 *Hutcherson.*—Tree a strong grower and an early and free producer. Fruit of medium size, broad at calyx and tapering to the stem. Stem one inch long and slender. Skin greenish yellow, with a few small gray dots. Flesh white, juicy, melting, sweet with no pronounced flavour. Season early August.

2. *July Doyenne.*—Tree a medium grower and not productive. Fruit below medium, obovate pyriform tapering to stem which is about an inch long. Calyx small, open. Basin shallow and open. Skin greenish yellow, with a dull reddish cheek. Flesh whitish, sweet, moderately juicy and a little gritty. Season August.

3. *Red Bergamot.*—Tree a poor grower and not productive. Fruit below medium size and nearly round. Stem medium in length. Calyx small, open. Basin wide, shallow. Skin pale yellow, with a dull red over most of the surface. Flesh yellowish, juicy, soft, sweet with a pleasant flavour. Season early September.

4. *Bergamot d'Ete.*—Tree a moderate grower and an early bearer. Fruit of medium size, obtuse, pyriform. Stem short. Cavity moderately deep. Calyx small, open. Basin wide, shallow. Skin yellow, freely sprinkled with gray dots, and with a bronze red cheek. Flesh yellowish, juicy, fine grained, buttery, sweet, with a good flavour. Season September.

5. *Beurre Amande.*—Tree a vigorous grower, but a poor producer. Fruit of medium size, acute, pyriform. Stalk moderately long, slender, curved. Calyx medium and open. Skin russet green. Flesh white, juicy, buttery, sweet with a pleasant flavour. Season September.

6. *Yat.*—Tree a moderate grower, and a poor bearer. Fruit small, obovate, pyriform. Stem short. Calyx large, open. Skin light green, with a few pale greenish spots. Flesh white, juicy, sweet, tender; decays very soon after ripening. Season September.

7. *Honey.*—Tree a vigorous grower. Fruit of medium size, roundish, pyriform. Stalk short and stout. Calyx open. Basin wide and shallow. Skin yellow, with a reddish cheek, and sprinkled with russet dots. Flesh a little coarse, not very juicy, sweet, with a pleasant flavour. Season September.

8. *Sutton's Great Britain.*—Tree a vigorous grower. Fruit large, obtuse, pyriform. Stem medium in length and stout, set in a narrow small cavity. Calyx large, open. Basin shallow. Skin yellow with a small red cheek and patches of russet, with many russet dots. Flesh white, juicy, a little coarse, sweet, with a pleasant flavour. Season September.

9. *Baronne de Mello.*—Tree a moderate grower. Fruit of medium size, acute pyriform, curved. Stem long, curved and fleshy at base. Calyx medium and closed. Skin yellow, with a reddish cheek and many russet dots. Flesh whitish, a little coarse, juicy, sub-acid, vinous, very pleasant; quality good. Season October.

10. *Esperine.*—Tree a vigorous grower. Fruit medium to large, pyriform. Stalk short, stout, with a lip or enlargement on one side. Calyx small, closed. Flesh white, juicy, buttery, sweet, with a very pleasant flavour. Season October.

11. *Kopertscher.*—Tree a strong grower. Fruit of medium size, roundish, oblate, or nearly globular. Stalk short and slender. Calyx large, open. Skin yellowish green, with small patches of russet and many brown dots. Flesh white, juicy, buttery, sweet, with a very pleasant flavour. Season October.

12. *Beurre de Ghelin.*—Tree a vigorous grower. Fruit medium to large, oblong, oval. Stem short, stout. Calyx large, open. Skin yellowish, with a little russet in patches. Flesh yellowish, juicy, fine grained, sweet with a pleasant flavour. Season November.

13. *Duhamel du Monceau.*—Tree vigorous. Fruit of medium size, roundish, pyriform. Stalk long and set at an angle in a slight cavity. Calyx open. Skin

pale greenish yellow, with a bronze cheek in the sun and many brown dots. Flesh whitish, fine-grained, juicy, buttery, sweet, a little vinous, with a very pleasant flavour. Season November.

14. *Beurre Lade.*—Tree a moderate grower. Fruit above medium size, oblong, obtuse, pear-shaped. Stalk long, curved and set in a small depression. Calyx small. Basin shallow, with knobby edges. Skin yellow with a little red in the sun. Flesh white, fine-grained, juicy, very sweet, with a fine aromatic flavour. Season November.

15. *Olivier de Serres.*—Tree a strong grower. Fruit above medium size, with a roundish form. Stem of medium size. Cavity moderately wide, shallow. Calyx large, open. Basin wide and shallow. Skin yellow, with patches of russet and sprinkled with reddish dots. Season winter.

16. *Vauquelin.*—Tree a strong grower. Fruit small, oblong, pyriform. Stem of medium length, stout, enlarged at the base. Calyx large, open. Skin russet yellow, with a dull red cheek. Season winter.

17. *Baronsbirne.*—Tree a vigorous grower. Fruit large, obovate, acute pyriform. Stalk long, curved, in a small cavity with a lip. Calyx large, open. Basin narrow and shallow. Skin pale greenish yellow, with many small reddish brown dots. Season winter.

18. *Colmar Dumortier.*—Tree a slow grower. Fruit of medium size, obtuse, pyriform. Stalk short. Cavity shallow, with a lip. Calyx small, open. Basin wide and shallow. Skin yellowish green, with dots and splashes of russet. Season winter.

19. *Franc-real.*—Tree a medium grower. Fruit small, roundish, pyriform. Stalk one inch long and set even. Calyx large, open. Skin dull yellow, with many brown dots and a bronze red cheek. Season winter.

20. *Charles Cognee.*—Tree a slow feeble grower. Fruit small ovate, obtuse, pyriform. Stalk of medium length, a little angular. Calyx small open. Basin narrow and shallow. Skin pale yellow, with a little russet about the stem and many brown dots. Season winter.

21. *Winter Jonah.*—Tree a medium grower. Fruit of medium size, roundish. Stalk one inch long, stout, and set in a very slight depression. Calyx large, open. Basin narrow and shallow. Skin pale yellow, with a faint blush on the sunny side, a few small dark greenish yellow spots, and many small gray dots. Season winter.

## PLUMS.

The season has been a very poor one for this fruit. The spring was unfavourable and bad weather conditions prevailed from the time the trees were in bloom until the crop was ripe. Cold rains in blooming time prevented a free setting of fruit and frequent rains afterwards interfered with effectual spraying to protect the fruit from rot, which was very prevalent again this season. This was especially so on the Experimental Farm orchard, where there are so many varieties, some of which are very susceptible to rot, and these spread the spores to other trees, and cause injury to the fruit of varieties that are, or would be under more favourable conditions, almost, if not quite, free from the disease. Very few of those most recently planted have fruited this year; the trees have in most cases grown well, and many of them bloomed, but the fruit did not set. The most satisfactory sorts which have fruited are listed in the order of their ripening. All are vigorous growers and free producers and desirable fruits.

Clyman,
Angelina,
Burdette,
Goliath,
Lincoln,
Mallard,
Cochet Pere,
Blue Apricot,
Belgian Purple.
Tragedy Prune,
Sultan,
Mitchelson,
Diamond,
Bittern,
Grand Duke,
Monarch,
Italian Prune.

The following varieties fruited for the first time :—

1. *Blue Rock.*—Tree a vigorous grower. Fruit of medium size, round, slightly flattened at stem. Stem short, inserted in a small cavity. Suture distinct. Skin dark purple, with a heavy whitish bloom and sprinkled with small gray dots. Flesh yellowish, juicy, sweet, with a rich pleasant flavour. Season middle of August.

2. *Reine Claude Davion.*—Tree a strong grower. Fruit below medium in size, globular. Suture short and shallow. Stem short and set in a small depression. Skin pale greenish yellow, with reddish purple spots. Flesh greenish yellow, sweet, juicy, with a pleasant flavour. Season middle of August.

3. *Apple.*—Tree a vigorous grower. Fruit large, round, heart-shaped. Suture deep and terminating in a point one side enlarged. Stem of medium length and set in a shallow depression. Skin deep glossy red with many small white dots. Flesh yellowish, stained with red, sweet, sprightly with a pleasant flavour. Season August.

4. *Late Prolific.*—Tree a strong grower. Fruit below medium size, globular. Suture very shallow and short. Stem medium size and no cavity. Skin dark purple, with a heavy bluish bloom. Flesh greenish yellow, juicy, with a pleasant flavour. Stone small. Season late August.

5. *Guthrie's Green Gage.*—Tree a vigorous grower. Fruit above medium in size. globular, one side enlarged. Skin greenish yellow, with a thin whitish bloom. Stem short. Cavity small and shallow. Flesh greenish yellow, juicy, sweet, with a fine flavour. Season last of August.

6. *Late Orange.*—Tree a strong grower. Fruit large, globular. Suture distinct. Stem short, in a narrow depression, one side enlarged. Skin deep orange, with a reddish cheek. Flesh juicy, tender, sweet, with a pleasant flavour. Season last of August.

7. *Late Black Orleans.*—Tree a vigorous grower. Fruit below medium in size. round. Suture distinct. Stem of medium length, set in small cavity. Skin black, with a thin blue bloom and sprinkled with brown dots. Flesh yellow, juicy, sweet, with a pleasant flavour. Season September.

8. *Kentish Diamond.*—Tree a medium grower. Fruit of medium size, oval, pointed at the apex. Suture distinct, one side enlarged. Stem of medium length. Skin black, with a light blue bloom. Flesh yellowish, rather coarse, not very juicy, sprightly. Season September.

9. *Brahy's Green Gage.*—Tree a strong grower. Fruit medium to large, roundish. Suture wide. Stem short and stout. Cavity wide. Skin greenish yellow, mottled with darker green, and a thick white bloom. Flesh yellowish green, juicy, sweet, with a pleasant flavour. Season September.

10. *Wyedale.*—Tree a strong, upright grower. Fruit of medium size, roundish, oval. Stem short. Cavity small. Suture distinct. Skin dark greenish purple, with a whitish bloom. Flesh greenish, juicy and sprightly. Season October.

## CHERRIES.

As in the case of the other fruits, the cold, wet weather prevented the blossoms setting, and the small crop of sweet cherries which some trees produced were cracked and spoiled by the rains when they were maturing.

Very few of the young trees blossomed, and only one or two produced fruit.

1. *Bigarreau Jaboulay.*—Tree a strong grower. Fruit very large, blunt, heart-shaped. Stem long and set in a shallow depression. Skin dark glossy red. Flesh and juice red, tender, sweet, juicy, with a very fine flavour. Last of June.

2. *Amarelle Hative.*—Tree a slender, vigorous grower. Fruit below medium size, roundish. Stem long and set in a narrow depression. Skin deep glossy red. Flesh and juice red, tender, juicy, sprightly, very pleasant. Season last of June.

3. *Brindilles.*—Tree a low slender grower. This variety has blossomed for two years in middle of June, and the fruit ripens late in August. The two trees are healthy and vigorous. Fruit of medium size, round, depressed or oblate. Stem long, set in a narrow depression. Skin light, clear red. Flesh reddish, tender, juicy, sprightly. Ripe last of August.

## PEACHES, APRICOTS AND NECTARINES.

The few trees of these fruits which remain have bloomed freely both on the mountain and on the level land, but there was no fruit.

## QUINCES.

*Portuguese.*—This variety makes a vigorous growth, and fruited last year and again this season. It is promising, as the fruit is fine, and having fruited in two unfavourable years in succession, it is likely to be a regular bearer. It is the only one of the quinces tried which has produced fruit, although several varieties were planted in the spring of 1890, and have grown to be fairly large bushes.

## *MEDLARS.*

All varieties of this fruit produced crops again this year.

## GRAPES.

The grapes were very late in starting growth this season and late in blossoming. Nearly all the vines produced fruit, but owing to the late spring and cool wet autumn, even the earliest sorts did not ripen.

## MULBERRIES.

As usual the mulberry trees were full of fruit, which is very much appreciated by the robins.

## MOUNTAIN ORCHARDS.

The fruit trees on the mountains continue to make a strong growth, and a few of the apple trees produced fruit this season, but being so far isolated and unprotected, birds and wild animals destroy much of the fruit. As it has been clearly demonstrated that fruit trees as well as nut trees do well on these lower hills this will be a guide to many who may be able to preserve and protect trees in such situations.

## NUT ORCHARDS.

The English and American black walnuts produced a small crop of nuts this year, and the Japanese walnut and the heart-shaped walnut gave fine crops. All of these nuts are being distributed to planters throughout the province, and many report very fair success in growing the young trees.

## SMALL FRUITS.

The crop of small fruits was fairly good this year, although a little later than usual.

### YELLOW AND RED RASPBERRIES.

There are now under test here seventy-three varieties of red and yellow raspberries. These have all been described in previous reports.

After several years' trial under similar conditions, the following varieties have proved the best: In quality Sarah is superior to all the others, and equal to any in productiveness, although it is not quite so firm as Cuthbert.

| Name. | Date of Ripening. | Growth of Plant. | Size of Fruit. | Quality. | Productiveness. |
|---|---|---|---|---|---|
| Red Phœnix | June 28 | Vigorous | Large | Firm, good quality | Productive. |
| New Fastolf | July 4 | " | " | " " | " |
| Duke of Brabrant | " 4 | " | " | " " | " |
| Northumberland Fill Basket. | " 4 | " | Very large | " " | " |
| Belle de Fontenay | " 5 | " | Large medium | " " | " |
| Sarah | " 6 | " | " | Very good quality | " |
| Lord Beaconsfield | " 7 | " | Large | Firm, good quality | " |
| London | " 7 | " | Large medium | " " | " |
| All Summer | " 9 | " | Large | " " | " |
| Cuthbert | " 9 | " | " | " " | " |
| R. B. Whyte | " 10 | " | " | " " | " |
| French Vice-President | " 10 | " | " | " " | " |
| Shaffers Colossal | " 10 | " | " | Purplish red; firm; acid. fair quality. | " |
| Yellow Golden Queen | " 6 | " | " | Firm, good quality | " |
| Large Yellow | " 7 | " | " | " " | " |

### BLACK CAP RASPBERRIES.

Nineteen varieties of Black Cap raspberries are under test.

Black Caps are rather an uncertain crop. They require very rich ground and moisture, as well as sunshine when the berries are growing and ripening.

The following are the best which have been tried here:—

| Name. | Date of Ripening. | Growth of Plant. | Size of Fruit. | Quality. | Productiveness. |
|---|---|---|---|---|---|
| Nemaha | July 10 | Vigorous | Large | Good quality | Productive. |
| Conrath | " 10 | " | " medium. | " | " |
| Older | " 10 | " | " " | " | " |
| Kansas | " 10 | " | " " | " | " |
| Palmer | " 11 | " | Medium | " | " |
| Gregg | " 11 | " | Large | " | " |
| Progress | " 11 | " | " medium. | " | " |
| Mammoth Cluster | " 12 | " | " | " | " |
| Ida | " 12 | " | " medium. | " | " |

### BLACKBERRIES.

The blackberries were a good crop this year. There are twenty-nine varieties of this fruit under trial here; of these the following are the best, named in the order of merit:—

| Name. | Date of Ripening. | Growth of Plant. | Size of Fruit. | Quality. | Productiveness. |
|---|---|---|---|---|---|
| Eldorado | July 22 | Vigorous | Large | Sweet; melting; no core. | Productive. |
| Stone's Hardy | " 22 | " | " | Very good quality | " |
| Erie | " 24 | " | " | " " | " |
| Maxwell | " 28 | " | " | " " | " |
| Early King | " 15 | " | " | " " | " |
| Snyder | " 20 | " | " medium. | " " | " |
| Agawam | " 26 | " | " | " " | " |
| Taylor | " 25 | " | " | " " | " |
| Hansel | " 20 | " | " | " " | " |

The only blackberry fruiting this year for the first time was the Rathburn, July 20. A weak grower. Fruit small to large, of medium quality, sweet, moderately productive.

### RED AND WHITE CURRANTS.

The crop of currants as a whole was rather light. Of the forty-two varieties under test, the following are the best:—

| Name. | Date of Ripening. | Growth of Plant. | Size of Fruit. | Quality. | Productiveness. |
|---|---|---|---|---|---|
| Red Cherry | July 4 | Vigorous | Large | Very good quality | Productive. |
| London | " 4 | " | Large medium | Good quality | " |
| Raby Castle | " 4 | " | " | " | " |
| Pomona | " 4 | " | " | " | " |
| La Fertile | " 4 | " | " | " | " |
| La Conde | " 5 | " | " | " | " |
| Prince Albert | " 6 | " | " | " | " |
| White Cherry | " 8 | " | " | " | " |
| Red Gondoin | " 10 | " | " | " | " |
| Large, white Brandenburg | " 10 | " | " | " | " |
| Victoria | " 10 | " | " | " | " |
| White Pearl | " 10 | " | " | " | " |

### BLACK CURRANTS.

Fifty-one varieties of black currants are under test here. Of these the following are the best:—

| Name. | Date of Ripening. | Growth of Plant. | Size of Fruit. | Quality. | Productiveness. |
|---|---|---|---|---|---|
| Dominion ...... | July 10. | Vigorous ... | Large medium | Good quality ............... | Productive. |
| Merveille de la Gironde ...... | " 10. | " ... | " .. | " ...... ........ | " |
| Boskoop Giant.. | " 10. | " ... | Very large.... | Very good quality........... | " |
| Prince of Wales. | " 10. | " ... | Large ........ | Good quality .............. | " |
| Middlesex...... | " 10. | " ... | " ........ | " ............... | " |
| London ........ | " 12. | " ... | Large medium | " ............... | " |
| Victoria........ | " 12. | " ... | " .. | " ..... ....... | " |
| Baldwin ....... | " 12. | " ... | " .. | " ............... | " |
| Black Naples... | " 12. | " ... | " .. | " ..... ........ | " |
| Lee's Prolific . . | " 12. | " ... | " .. | " ...... ........ | " |
| Pearce ........ . | " 12. | " ... | " .. | " ......... ..... | " |
| Pomona........ | " 12. | " ... | Large ........ | " ... .. ........ | " |
| Climax......... | " 12. | " ... | Large medium | " ............... | " |

### METEOROLOGICAL RECORD.

| Date of Highest Temperature. | Temperature. | Date of Lowest Temperature. | Temperature. | Rainfall. | Snowfall. | Sunshine. | |
|---|---|---|---|---|---|---|---|
| 1902. | ° | | ° | Inches. | Inches. | Hours. | Minutes. |
| December 1......... | 50 | December 10. .... | 27 | 6·74 | 6 | 17 | 12 |
| 1903. | | | | | | | |
| January 2 .... .... | 53 | January 26 ...... | 26 | 4·49 | 9 | 41 | 42 |
| February 19 .. .... | 52 | February 2 ...... | 21 | 1·04 | 0 | 130 | 18 |
| March 27. .......... | 62 | March 11 ....... | 18 | 4·64 | 20 | 131 | 12 |
| April 28............ | 65 | April 22. ........ | 30 | 5·30 | ........ | 89 | 30 |
| May 30............. | 76 | May 14.......... | 36 | 3·58 | .. ...... | 128 | 54 |
| June 9.. ........... | 93 | June 6........... | 46 | 6·00 | ........ | 159 | 00 |
| July 11............. | 89 | July 8....... .... | 44 | 2·30 | . . .... | 184 | 18 |
| August 10 . ....... | 85 | August 27........ | 44 | 5·08 | ......... | 132 | 54 |
| September 18........ | 75 | September 30..... | 35 | 7·30 | ... .... . | 106 | 00 |
| October 24... ...... | 68 | October 14 and 15. | 33 | 2·71 | ........ | 111 | 24 |
| November 2 ... ... | 54 | November 17..... | 22 | 3·31 | 11 | 32 | 12 |
| | | Totals.. .... | .......... | 51·89 | 46 | 1,264 | 36 |

Although the season has been so showery during haying and harvest, the rainfall has for the whole year been below the average.

I have the honour to be, sir,
Your obedient servant,

THOMAS A. SHARPE.

# STATEMENT OF EXPENDITURE ON THE DOMINION EXPERIMENTAL FARMS FOR THE YEAR ENDING JUNE 30, 1903.

## CENTRAL EXPERIMENTAL FARM—EXPENDITURE, 1902-3.

| | | |
|---|---|---|
| Live stock | $ | 1,146 08 |
| Feed for stock, including supplies from experimental plots, $295.50. | | 1,496 43 |
| Veterinary services and drugs | | 64 06 |
| Seed grain seeds, trees, &c | | 446 21 |
| Implements, tools, hardware and supplies | | 708 67 |
| Drainage and drain tiles | | 1,958 06 |
| Manure and fertilizers for experimental plots and horticultural department | | 310 42 |
| Travelling expenses | | 1,651 66 |
| Exhibition expenses, including value of grain held over for exhibitions | | 723 33 |
| Blacksmithing, harness supplies and repairs | | 379 54 |
| Bee department | | 218 47 |
| Salaries of officers engaged in the general work of the farms, proportion chargeable to the Central Farm. | | 1,792 49 |
| Wages, farm work, including experimental work with grain and other farm crops; also salaries of officers in charge | | 6,840 84 |
| Wages, care of stock | | 3,087 45 |
| Chemical division, proportion chargeable to Central Farm | | 1,412 90 |
| Botanical and Entomological division, proportion chargeable to the Central Farm | | 1,442 56 |
| Horticultural division, including salary of officer in charge | | 5,110 92 |
| Poultry division, including all supplies; also salary of officer in charge | | 1,992 04 |
| Forestry division and care of grounds | | 1,335 81 |
| Arboretum, including drawing and spreading of 380 loads of gravel on roads | | 1,892 03 |
| Distribution of trees and tree seeds, including $85.58 value of tree seeds supplied by Brandon and Indian Head Farms | | 157 74 |
| Office help, correspondence branch and messenger service. | | 4,018 71 |
| Printing of office supplies and stationery | | 826 68 |
| Seed testing and care of greenhouses | | 1,019 39 |
| Dairy branch, including wages of dairyman | | 715 27 |
| Contingencies, including $104 for 197 loads of gravel and work on roads | | 320 34 |
| Books and newspapers | | 104 35 |
| Telegrams and telephones | | 144 06 |
| Steers purchased for feeding experiments | | 2,787 85 |
| | $ | 44,104 36 |
| **Less**—Proceeds of sale of steers purchased for feeding experiments | | 4,082 00 |
| | $ | 40,022 36 |

## EXPERIMENTAL FARM, NAPPAN, N.S.—EXPENDITURE, 1902-3.

| | |
|---|---|
| Live stock | $ 205 68 |
| Feed for stock | 1,816 77 |
| Veterinary services and drugs | 26 68 |
| Seed grain, seeds, trees, &c. | 27 17 |
| Implements, tools, hardware and supplies | 261 57 |
| Manure and fertilizers | 70 60 |
| Travelling expenses | 168 19 |
| Exhibition expenses | 269 90 |
| Blacksmithing, harness supplies and repairs | 63 21 |
| Salary of Superintendent, including proportion of salaries for general work, Ottawa | 2,545 62 |
| Wages, farm work, including experimental work with farm crops | 2,109 48 |
| Wages, care of stock | 1,353 08 |
| Chemical division, proportion chargeable to each branch farm | 824 19 |
| Botanical and Entomological division, proportion chargeable to each branch farm | 586 25 |
| Poultry branch | 89 87 |
| Horticultural division, including experimental work with vegetables, fruits, forest and ornamental trees and flowers; also care of grounds and salary of officer in charge | 1,408 68 |
| Distribution of seed grain, potatoes, &c | 198 14 |
| Contingencies, including postage, $105; mail delivery, $82.50 | 237 50 |
| Printing and stationery | 23 57 |
| Books and newspapers | 23 50 |
| Telegrams and telephones | 19 05 |
| Drainage and drain tiles | 11 25 |
| Steers purchased for feeding experiments | 990 00 |
| | $ 13,329 95 |
| Less—Proceeds of sale of steers purchased for feeding experiments | 1,830 00 |
| | $ 11,499 95 |

## EXPERIMENTAL FARM, BRANDON, MAN.—EXPENDITURE, 1902-3.

| | | |
|---|---|---|
| Live stock | | $ 244 67 |
| Feed for stock | | 182 07 |
| Veterinary services and drugs | | 21 65 |
| Seed grain, trees, seeds, &c. | | 33 86 |
| Implements, tools, hardware and supplies | | 746 49 |
| Travelling expenses | | 124 26 |
| Exhibition expenses | | 185 16 |
| Blacksmithing, harness supplies and repairs | | 218 10 |
| Bee department | | 13 84 |
| Salary of Superintendent, including proportion of salaries for general work, Ottawa | | 2,545 62 |
| Wages, farm work, including experimental work, with farm crops, &c. | | 2,347 91 |
| Wages, care of stock | | 929 00 |
| Chemical division, proportion chargeable to each branch farm | | 824 19 |
| Botanical and Entomological division, proportion chargeable to each branch farm | | 586 25 |
| Horticultural branch, including experiments with vegetables, fruits and flowers; also care of arboretum and grounds | | 502 64 |
| Forestry branch, including care of hedges | | 360 50 |
| Poultry branch | | 62 62 |
| Office help, including delivery of mail, $110 | | 689 99 |
| Distribution of seed grain, potatoes, &c | | 225 90 |
| Distribution of trees and tree seeds | | 306 81 |
| Contingencies, including postage, $243.06 | | 268 82 |
| Printing and stationery | | 37 50 |
| Books and newspapers | | 18 00 |
| Telegrams and telephones | | 30 43 |
| Drainage and drain tiles | | 53 50 |
| Manure and fertilizers | | 239 25 |
| Steers purchased for feeding experiments | | 474 17 |
| | | $ 12,273 20 |
| Less—Proceeds of sale of steers purchased for feeding experiments | $ 566 05 | |
| Value of grain supplied for seed distribution at Ottawa | 125 48 | |
| | | 691 53 |
| | | $ 11,581 67 |

## EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.—EXPENDITURE, 1902-3.

| | | |
|---|---|---|
| Live stock | | $ 37 16 |
| Feed for stock | | 39 20 |
| Veterinary services and drugs | | 45 35 |
| Seed grain, seeds, trees, &c | | 13 70 |
| Implements, tools, hardware and supplies | | 919 83 |
| Travelling expenses | | 143 13 |
| Exhibition expenses | | 19 83 |
| Blacksmithing, harness supplies and repairs | | 111 95 |
| Salary of Superintendent, including proportion of salaries for general work, Ottawa | | 2,545 62 |
| Wages, farm work, including experimental work with farm crops | | 2,958 99 |
| Wages, care of stock | | 819 90 |
| Chemical division, proportion chargeable to each branch farm | | 824 19 |
| Botanical and Entomological division, proportion chargeable to each branch farm | | 586 25 |
| Horticultural branch | | 388 53 |
| Poultry branch | | 67 13 |
| Forestry branch, including hedges | | 65 00 |
| Office help, including delivery of mail | | 594 54 |
| Distribution of seed grain, potatoes, &c | | 596 42 |
| Distribution of trees and tree seeds | | 101 25 |
| Contingencies, including postage, $378.38 | | 479 98 |
| Printing and stationery | | 50 79 |
| Telegrams and telephones | | 37 90 |
| Manure and fertilizers | | 37 00 |
| Books and newspapers | | 6 00 |
| Steers purchased for feeding experiments | | 700 87 |
| | | $ 12,190 51 |
| LESS—Proceeds of sale of steers purchased for feeding experiments | $ 909 30 | |
| Value of grain supplied for grain distribution at Ottawa | 712 64 | |
| | | 1,621 94 |
| | | $ 10,568 57 |

## EXPERIMENTAL FARM, AGASSIZ, B.C.—EXPENDITURE, 1902-3.

| | |
|---|---|
| Live stock | 926 30 |
| Feed for stock | 76 74 |
| Veterinary services and drugs | 6 30 |
| Seed grain, seeds, trees, &c | 105 19 |
| Implements, tools, hardware and supplies | 348 39 |
| Manure and fertilizers | 160 06 |
| Travelling expenses | 124 29 |
| Exhibition expenses | 323 44 |
| Blacksmithing, harness supplies and repairs | 80 56 |
| Salary of Superintendent, including proportion of salaries for general work, Ottawa | 2,545 61 |
| Wages, farm work, including experimental work with farm crops, vegetables, fruit trees, vines, &c | 2,445 23 |
| Wages, care of stock | 542 96 |
| Chemical division, proportion chargeable to each branch farm | 824 19 |
| Botanical and Entomological division, proportion chargeable to each branch farm | 586 25 |
| Poultry branch | 70 30 |
| Forestry branch, including care of hedges | 134 40 |
| Office help | 112 50 |
| Distribution of seed grain, potatoes, &c | 160 74 |
| Distribution of trees and tree seeds | 2 00 |
| Clearing land | 596 40 |
| Contingencies, including postage, $110.22 | 155 63 |
| Printing and stationery | 0 70 |
| Books and newspapers | 21 50 |
| Drainage and drain tiles | 105 95 |
| | $ 10,455 63 |

### SUMMARY OF EXPENDITURE, 1902-3.

| | | |
|---|---|---|
| Central Experimental Farm | | $ 40,022 36 |
| Nappan " | | 11,499 95 |
| Brandon " | | 11,581 67 |
| Indian Head " | | 10,568 57 |
| Agassiz " | | 10,455 63 |
| Distribution of seed grain, potatoes, &c., from Central Experimental Farm, including value of grain supplied from Brandon and Indian Head Experimental Farms | | 5,871 82 |
| Printing bulletins and distribution of bulletins and reports | $ 7,000 00 | |
| LESS special sum in estimates for this item | 7,000 00 | |
| | | $ 90,000 00 |

## SUMMARY OF STOCK, MACHINERY, IMPLEMENTS, &c., ON HAND DECEMBER 31, 1903.

### CENTRAL EXPERIMENTAL FARM, OTTAWA, ONT.

| | |
|---|---|
| 19 Horses | $ 3,765 00 |
| 13 Ayrshire cattle | 1,515 00 |
| 12 Guernsey cattle | 1,330 00 |
| 11 Durham cattle (Shorthorns) | 2,705 00 |
| 7 Canadian cattle | 875 00 |
| 34 Grade cattle | 875 00 |
| 31 Yorkshire swine | 840 00 |
| 5 Berkshire swine | 175 00 |
| 7 Tamworth swine | 158 00 |
| 140 Grade swine | 697 19 |
| 4 Large black swine | 120 00 |
| 25 Shropshire sheep | 665 00 |
| 9 Leicester sheep | 245 00 |
| 1 Grade sheep | 12 00 |
| Farm machinery and implements | 2,782 50 |
| Vehicles, including farm wagons and sleighs | 1,129 00 |
| Hand tools, hardware and sundries | 1,099 65 |
| Harness | 553 25 |
| Dairy department, machinery, &c | 510 00 |
| Horticultural and forestry departments, implements, tools, &c | 606 25 |
| Botanical department, implements, tools, &c | 4 95 |
| Poultry department, 222 fowls | 218 75 |
| Poultry department, implements, furnishings, &c | 113 30 |
| Bees and apiarian supplies | 454 78 |
| Chemical department, apparatus and chemicals | 1,875 00 |
| Books in several departments | 546 55 |
| Greenhouse plants, supplies, &c | 2,082 75 |
| Furniture at Director's house | 1,100 00 |
| Office furniture and stationery | 1,617 25 |
| | $ 28,671 17 |

### EXPERIMENTAL FARM, NAPPAN, N.S.

| | |
|---|---|
| 8 Horses | $ 1,085 00 |
| 5 Guernsey cattle | 905 00 |
| 5 Holstein cattle | 325 00 |
| 14 Ayrshire cattle | 890 00 |
| 1 Jersey cow | 50 00 |
| 48 Grade cattle | 1,567 50 |
| 5 Yorkshire swine | 120 00 |
| 3 Berkshire swine | 70 00 |
| 52 Grade swine | 290 00 |
| 16 Sheep | 245 00 |
| 100 Fowls | 60 90 |
| Bees and apiarian supplies | 10 30 |
| Vehicles, including farm wagons and sleighs | 386 50 |
| Farm machinery | 517 00 |
| Farm implements | 213 00 |
| Hand tools, hardware and sundries | 360 45 |
| Harness | 185 50 |
| Furniture for reception room and bedroom for visiting officials | 154 00 |
| Furniture supplies and books for office | 90 00 |
| | $ 7,525 15 |

## EXPERIMENTAL FARM, BRANDON, MAN.

| | | |
|---|---|---|
| 12 Horses | $ | 1,075 00 |
| 3 Ayrshire cattle | | 150 00 |
| 5 Durham cattle | | 475 00 |
| 2 Guernsey cattle | | 150 00 |
| 7 Grade cattle | | 297 00 |
| 1 Tamworth pig | | 15 00 |
| 4 Berkshire swine | | 40 00 |
| 5 Yorkshire swine | | 50 00 |
| 1 Grade pig | | 5 00 |
| 93 Fowls | | 93 00 |
| Bees and apiarian supplies | | 101 95 |
| Vehicles, including farm wagons and sleighs | | 435 00 |
| Farm machinery | | 2,126 33 |
| Farm implements | | 654 00 |
| Hand tools, hardware and sundries | | 643 75 |
| Harness | | 218 50 |
| Furniture for reception room and bedroom for visiting officials | | 161 55 |
| Furniture supplies and books for office | | 286 30 |
| | $ | 6,977 38 |

## EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.

| | | |
|---|---|---|
| 13 Horses | $ | 1,460 00 |
| 18 Durham cattle | | 1,625 00 |
| 19 Grade cattle | | 660 00 |
| 3 Berkshire swine | | 45 00 |
| 8 Tamworth swine | | 85 00 |
| 2 Yorkshire White swine | | 45 00 |
| 6 Grade swine | | 36 00 |
| 63 Fowls | | 63 00 |
| Bees and apiarian supplies | | 25 75 |
| Vehicles, including farm wagons and sleighs | | 576 00 |
| Farm machinery | | 2,213 33 |
| Farm implements | | 718 00 |
| Hand tools, hardware and sundries | | 373 55 |
| Harness | | 185 30 |
| Furniture for reception room and bedroom for visiting officials | | 217 50 |
| Furniture supplies and books for office | | 367 50 |
| | $ | 8,695 93 |

## EXPERIMENTAL FARM, AGASSIZ, B.C.

| | | |
|---|---|---|
| 6 Horses | $ | 715 00 |
| 17 Durham cattle | | 1,275 00 |
| 14 Dorset horned sheep | | 127 50 |
| 8 Berkshire swine | | 110 00 |
| 3 Yorkshire White swine | | 85 00 |
| 76 Fowls | | 56 00 |
| Bees and apiarian supplies | | 43 95 |
| Vehicles, including farm wagons | | 207 50 |
| Farm machinery | | 508 50 |
| Farm implements | | 137 50 |
| Hand tools, hardware and sundries | | 153 50 |
| Harness | | 91 00 |
| Furniture for reception room and bedroom for visiting officials | | 165 40 |
| Furniture supplies and books for office | | 129 00 |
| | $ | 3,804 85 |

THOS. M. CRAMP, *Accountant.*

# INDEX

PAGE.
AGRICULTURIST—Report of .. .. .. .. .. 57
  Beef production .. .. .. .. .. .. .. ..67-75
    " " influence of age on cost.. 70
  Baby beef .. .. .. .. .. .. .. .. 72
  Cattle .. .. .. .. .. .. .. .. .. .. 57
    Ayrshire .. .. .. .. .. .. .. .. .. 57
    Dairy .. .. .. .. .. .. .. .. .. .. 59
    Grade .. .. .. .. .. .. .. .. .. .. 58
    Guernsey .. .. .. .. .. .. .. .. .. 57
    Shorthorn .. .. .. .. .. .. .. .. .. 57
    Canadian .. .. .. .. .. .. . 57
    Steers .. .. .. .. .. .. .. .. .. .. 58
  Clovers, experiments with .. .. .. .. 83
  Corn, varieties grown for ensilage .. .. 85
    Cost to grow 34 acres .. .. .. .. .. 85
  Dairy herds, the .. .. .. .. .. .. .. 61
    Monthly statements .. .. .. .. .. .. 61
    Financial and general statements ..61-62
    Daily dairy herd records .. .. .. ..... 66
    Feeding, summer .. .. .. .. .. .. .. 59
    Feeding, cost of .. .. .. .. .. .. .. 60
    Feed, amount consumed by .. .. .. .. 77
  Dairy herd reports .. .. .. .. .. .. .. 61
    Ayrshires .. .. .. .. .. .. .. .. .. 63
    Ayrshire grades .. .. .. .. .. .. .. 64
    Canadians .. .... .. .. .. .. .. .. 64
    Canadian grades . .. .. .. .. .. .. 65
    Guernseys .. .. .. .. .. .. .. .. .. 62
    Guernsey grades .. .. .. .. .. .. .. 65
    Shorthorns .. .. .. .. .. .. .. .. .. 63
    Shorthorn grades .. .. .. .. .. .. .. 64
  Farm, the 200 acre .. .. .. .. .. .. .. 75
    Crop on in 1903 .. .. .. .. .. .. .. 80
    Comparative statement of crops on from 1899 to 1903 .. .. .. .. .. .. 76
    Estimating cost of producing crops thereon .. .. .. .. .. .. .. .. .. 79
  Feed produced on and utilization thereof in 1902 .. .. .. .. .. .. .. .. .. 77
    Financial summary .. .. .. .. .. .... 79
  Grasses, experiments with .. .. .. .. 83
  Hay, produced in 1903 .. .. .. .. .. .. 83
    Cost of growing 66 acres .. .. .. .. 83
  Horses .. .... .. .. .. .. .. .. .. .. 57
    Cost of feeding .. .. .. .. .. .... 59
    Food consumed .. .. .. .. .. .. .... 77
    Labour, value of .. .. .. .. .. .. .. 78
  Letter of trasmittal .. .. .. .. .. .. 57
  Litter for cattle, experiment with .. .. 87

PAGE.
AGRICULTURIST, Report of—*Con.*
  Live stock .. .. .. .. .. .. .. .. .. .... 57
    Horses .. .. .. .. .. .. .. .. .. .. .. 57
    Cattle .. .. .. .. .. .. .. .. .. .. ... 58
    Sheep .. .. .. .. .. .. .. .. .. .. ... 58
    Swine.. .. .. .. .. .. .. .. .. .. .. .. 58
    Financial statements .. .. .. .. .. .. 78
  Mixed crops .. .. .. .. .. .. .. .. .... 81
  Oats, varieties grown 1903 .. .. .. .. .. 80
    Cost to grow 52 acres of .. .. .. .... 81
      " produce 1 bushel .. .. .. .... 81
      " analyzed .. .. .. .. .. .. .. ... 81
  Roots, varieties grown .. .. .. .. .. .. 86
  Seed, influence of amount sown upon quantity and quality of yield .. ..... 82
  Silo, stave cost of .. .. .. .. .. .. .. .. 79
  Silo, experimental, how filled 1903 .. .. 86
  Steers, experiments with .. .. .. .... 67-75
    Loose vs. tied .. .. .. .. .. .. .. ... 67
    Influence of age on cost of putting on flesh .. .. .. .. .. .. .. .. .. .. ... 70
    Feeding calves up to six months .. .. 72
    Feeding calves 6 months to 1 year old 72
    Feeding yearlings .. .. .. .. .. .. .. 71
    Feeding two year olds .. .. .. .. .... 71
    Feeding three year olds .. .. .. .... 71
    Amount of food eaten from birth to block by one steer .. .. .. .. .. ..... 73
  Long vs. short feed beef, compared... 73
  Weed seeds, vitality of in manure as affected by rotting of manure .. .... 87
  Weight, loss of in hay experiment .. .. 84
    Loss of in meal on farm .. .. .. .. 77
    Loss of in hay on farm .. .. .. .. ... 77
    Loss of in ensilage and roots on farm 77
Bedford, S. A., Superintendent of Experimental Farm, Brandon, Manitoba, Report of .. .. .. .. .. .. .. .. .... 313
Blair, W. S., Horticulturist, Experimental Farm, Nappan, Report of.... .... .... 299
CHEMIST, Report of.. .. .. .. .. .. .. .. 127
  Acknowledgments.. .. .. .. .. .. .. .. 129
  Alfalfa and clover, analysis of.. .. .. 133
  Banner oats .. .. .. .. .. .. .. .. .. .. 134
  Beeswax .. .. .. .. .. .. .. .. .. .. .. 157
  Brans and shorts.. .... .. .. .. .. .. .. 135
    Canadian.. .. .. .. .. .. .. .. .. .. .. 137
  Bug finish.. .. .. .. .. .. .. .. .. ..127, 153

PAGE.

CHEMIST, Report of—*Con.*
Chemistry of bee-keeping.. .. .. .. ..128, 155
Horticulture.... .. .. .. .. .. .. .. .. 127
Insecticides and fungicides.. .. .. .. 152
Chicken fattening, experiments in.. .... 128
Clover and alfalfa, analysis of.. .. .. .. 133
Conservation of moisture in orchard soils.. .. .. .. .. .. .. .. .. .. ..127, 129
Correspondence.. .. .. .. .. .. .. .. .. 128
Cotton seed meal.. .. .. .. .. .. .. .. 142
'Cover' crops, legumes in orchard....127, 132
Early Riga wheat .. .. .. .. .. .. .. .. 128
Fertilizers and waste products, naturally-occurring.. .. .. .. .. .. .. .. .. 148
Peat and muck.. .. .. .. .. .. .. .. .. 149
Refuse from potato starch factory.. .. 151
Swamp deposits.. .. .. .. .. .. .. .. 148
Tobacco refuse.. .. .. .. .. .. .. .. .. 150
Fodders and feeding stuffs.. .. .. .. ..128, 134
Banner oats.. .. .. .. .. .. .. .. .. .. 134
Brans and shorts .. .. .. .. .. .. .. ... 135
Canadian brans.. .. .. .. .. .. .. .. .. 137
Canadian shorts.. .. .. .. .. .. .. .. 138
Cotton seed meal.. .. .. .. .. .. .. .. 142
Improved molasses cattle food .. ..128, 140
Molassine meal.. .. .. .. .. .. .. ..128, 139
Roots, relative value of.. .. .. .. .. .. 143
Formalin, Formaldehyde.... .... ...... 151
Hairy vetch.. .. .. .. .. .. .. .. ..127, 132, 134
Honey, storage of.. .. .. .. .. ..155, 156, 157
Horse bean.. .. .. .. .. .. .. .. .. ..127, 132, 134
Improved molasses cattle food.. .. ..128, 140
Insecticides and fungicides.. .. .. .. ....127, 152
Bug finish.. .. .. .. .. .. .. .. .. .. ..127, 153
Formalin, Formaldehyde .. .. .. .. .. 154
Kno-bug .. .. .. .. .. .. .. .. .. .. ..127, 152
Owens' compound for protecting trees. 127
Kno-bug .. .. .. .. .. .. .. .. .. .. ..127, 152
Legumes as orchard cover crops.. .. .. 127
Letter of transmittal .. .. .. .. .. .. .. 127
Mangels, dry matter and sugar in .. .. 144
Molassine meal.. .. .. .. .. .. .. .. ..128, 139
Muck and peat, uses and treatment of.. 149
composts.. .. .. .. .. .. .. .. .. .. .. 149
Naturally-occurring fertilizers and waste products.. .. .. .. .. .. .. .. .. .. 148
Oats, Banner .. .. .. .. .. .. .. .. 134
Orchard cover crops, legumes as.. ....127, 132
Soil, moisture conservation in.. ..127, 129
Owens' compound for protecting trees.. 127
Peat and muck, uses and treatment of.. 149
Percy wheat.. .. .. .. .. .. .. .. .. .. 128
Potato starch factory, refuse from.. .. 151
Precipitation, total.. .. .. .. .. .. .. .. 130
Preston wheat.. .. .. .. .. .. .. .. .... 128
Red Fife wheat.. .. .. .. .. .. .. .. .. 128
Roots, relative value of.. .. .. .. .. .. 143
Samples received for analysis.. .. ....128, 129

PAGE.

CHEMIST, Report of—*Con.*
Shorts and brans.. .. .. .. .. .. .. .. .. 135
Canadian.. .. .. .. .. .. .. .. .. .. .. .. 138
Soil moisture, conservation of .. .. ..127, 129
Soja bean.. .. .. .. .. .. .. .. .. ....127, 132, 134
Stanley wheat.. .. .. .. .. .. .. .. .. .. 128
Sugar beets.. .. .. .. .. .. .. .. .. .. ..128, 144
Grown on the Dominion Experimental Farms.. .. .. .. .. .. .. .. .. .. .. .. 145
From B.C., Agassiz.. .. .. .. .. .. .. .. 146
From Man., Brandon.. .. .. .. .. .. .. .. 146
From N.S., Nappan.. .. .. .. .. .. .. .. 145
From N.W.T., Indian Head.. .. .. .. .. 146
From N.W.T., Northern Alberta.. .. 146
From N.W.T., Southern Alberta.. .... 146
From Ont., Ottawa.. .. .. .. .. .. .... 146
From Ont., Wallaceburg.. .. .. .. .. 147
From P.E.I., Charlottetown.. .. .. .. 148
Sugar mangels.. .. .. .. .. .. .. .. .... 128
Swamp deposits, origin and nature of.. 148
muck .. .... .. .. .. .. .. .. .. .. .. 128
Tobacco refuse.. .. .. .. .. .. .. .. .... 150
Waters from farm homesteads .. .. ..128, 158
Wax, adulterated.. .. .. .. .. .. .. .... 128
Wheats.. .. .. .. .. .. .. .. .. .. .. .. .. 128
Early Riga .. .. .. .. .. .. .. .. .. .. 128
Percy.. .. .. .. .. .. .. .. .. .. .. .. .. 128
Preston.. .. .. .. .. .. .. .. .. .. .. ..... 128
Red Fife.. .. .. .. .. .. .. .. .. .. .. .. 128
Stanley.. .. .. .. .. .. .. .. .. .. .. .. .. 128

DIRECTOR,—Report of the.. .. .. .. .. .. 5
Acknowledgments .. .. .. .. .. .. .. .. 55
A journey to the west.. .. .. .. .. .. .. 49
Area of cultivable lands in Alberta.. .. 10
Area of cultivable lands in Assiniboia.. 10
Area of cultivable lands in Manitoba.... 10
Area of cultivable lands in Sackatchewan.. .. .. .. .. .. .. .. .. .. .. .. 10
Barr colonists .. .. .. .. .. .. .. .. .. 51
Battleford, journey to .. .. .. .. .. .... 51
Beet sugar factory in Southern Alberta 53
Canada's vast areas of farm lands .. .. 10
Clovers, experiments with .. .. .. .. ..31-33
Clover, increased crops from ploughing under of .. .. .. .. .. .. .. .. .. .. ..33-37
Clover, results of sowings of oats, wheat and barley after.. .. .. .. .. .. .. 31-33-37
Clover, results of ploughing under, on potato crop.. .. .. .. .. .. .. .. .. ..34-37
Clover, results of ploughing under, on corn crop.. .. .. .. .. .. .. .. .. .. ..33-37
Clover, results of ploughing under, on farm crops.. .. .. .. .. .. .. .. .. ..31-33
Co-operative experiments by Canadian farmers .. .. .. .. .. .. .. .. .. .. .. 41
Correspondence .. .. .. .. .. .. .. .. .. 40
Crops, action of fertilizers on.. .. .. ..24-30

PAGE.
DIRECTOR,—Report of the—*Con.*
Doukhobor villages, visit to .. .. .. .. .. 51
Ellis, Wm., reports of .. .. .. .. .. .. .. ..44-48
Experiments with fertilizers on barley 28
  On oats .. .. .. .. .. .. .. .. .. .. .. .. .. 30
  On wheat.. .. .. .. .. .. .. .. .. .. .. .. .. 26
Farm crops, exports of.. .. .. .. .. .. .. .. 5
Fertilizers, action of, on wheat, oats, clover and Brome grass .. .. .. .. .. ..38-40
Fertilizers, special experiments with.. 24
Financial statement .. .. .. .. .. .. .. .. 429
Grain tests, table of, for each province.. 46
Green clover as a fertilizer.. .. .. .. .. ..31-37
Leading cereal crops in Canada .. .. .. 6
Letter of transmittal .. .. .. .. .. .. .. .. 3
Louisiana purchase exposition, preparations for .. .. .. .. .. .. .. .. .. .... 55
Meteorological observations .. .. .. .. ..47-48
Notes on a journey westward .. .. .. .. 49
Oats .. .. .. .. .. .. .. .. .. .. .. .. .. .. .. 6
  Acreage of, in Ontario.. .. .. .. .. .. 6
  Acreage of, in Manitoba .. .. .. .. .. 6
  Analyses of hulls and kernels .. .. .. 8-9
  Banner.. .. .. .. .. .. .. .. .. .. .. .. .. 7
  Banner, its cultivation in Scotland.. 7
  Comparison of yields of, in Canada with United States.. .. .. .. .. .. .. 6
  Most productive varieties of.. .. .. .. 7
  Proportion of hull in leading varieties of.. .. .. .. .. .. .. .. .. .. .. .. .. .. 8
  Relative value of kernel and hull.. .. 7
  Wide Awake .. .. .. .. .. .. .. .. .. .... 7
  Wide Awake, its cultivation in Scotland.. .. .. .. .. .. .. .. .. .. .. .. .. 7
  Yield of, at experimental farms .. .. 6-7
Publications issued during the year.. .. 54
Reports on journeys made .. .. .. .. .. 49
St. Louis Exposition preparations for.. 55
Shutt, F. T., analysis of wheat .. .. ..19-20
Staff, additions to the .. .. .. .. ...... 54
Seed grain, distribution of .. .. .. .. ..41-44
Seed grain distribution, benefits of .. ..41-42
Seeds, tests of vitality of .. .. .. .. .. 44
Summary of stock, &c., on each Experimental Farm .. .. .. .. .. .. .. .. .. 432
Wide Awake, its cultivation in Scotland 7
*Triticum durum*.. .. .. .. .. .. .. .. .. .... 9
  " *dicoccum* .. .. .. .. .. .. .. .. 9
  " *polonicum* .. .. .. .. .. .. .. .. 9
  " *spelta* .. .. .. .. .. .. .. .. .. 9
  " *vulgare*.. .. .. .. .. .. .. .. .. 9
Wheat, analysis of .. .. .. .. .. .. .. ....19-22
  Analyses, deductions from.. .. .. .. .. 23
  Breeding of new varieties of.. .. .. .. 14
  Crops of, in Manitoba and the Territories.. .. .. .. .. .. .. .. .. .. .. .. 10
  Crops in Ontario.. .. .. .. .. .. .. .. 10
  Crops in, comparison of in Canada with the United States .. .. .. .. .. 12

PAGE.
DIRECTOR,—Report of the—*Con.*
  Different species cultivated .. .. .. .. 9
  Examined by experts for quality ..16-17-21
  From northern districts in Canada.. 11
  Growing of early varieties of.. .. .. .. 14
  High character of grain produced in Canada.. .. .. .. .. .. .. .. .. .. .. .. 12
  Review of work with, at Experimental Farms.. .. .. .. .. .. .. .. .. .. .. .. 13
  Total crops of, in United States .. .. 12
  World's crop of .. .. .. .. .. .. .. .. .. 9
  Early Riga.. .. .. .. .. .. .. .. .. .. .. 6-21
  Goose.. .. .. .. .. .. .. .. .. .. .. .. .. .. 21
  Ladoga.. .. .. .. .. .. .. .. .. .. .. .. 14
  Laurel.. .. .. .. .. .. .. .. .. .. .. .. .. 21
  Percy .. .. .. .. .. .. .. .. .. .. .. ..15-16-19
  Preston .. .. .. .. .. .. .. .. .. .. ..14-16-19
  Red Fife .. .. .. .. .. .. .. .. .. .. ..13-14 19
  Stanley.. .. .. .. .. .. .. .. .. .. .. ..14-16-19
  White Fife.. .. .. .. .. .. .. .. .. .. .. 21
Visit to Experimental Farm, Nappan, N.S... .. .. .. .. .. .. .. .. .. .. .. .. .. 49
Visit to Experimental Farm, Brandon,M. 49
Visit to Experimental Farm, Indian Head, N.W.T. .. .. .. .. .. .. .. .. .. .. 50
Visit to Experimental Farm, Agassiz, B.C... .. .. .. .. .. .. .. .. .. .. .. .. .. 52
Visit to Calgary and Edmonton districts 52
Visit to Regina and Prince Albert .. .. 52
Visit to Southern Alberta .. .. .. .. .. 52

ENTOMOLOGIST & BOTANIST, Report of..163-215
Acknowledgments.. .. .. .. .. .. .. .... 168
*Adalia bipunctata* .. .. .. .. .. .. .. .. .. 171
*Agrotis obeliscoides* .. .. .. .. .. .. .. ... 183
Alfalfa .. .. .. .. .. .. .. .. .. .. .. .. .... 163
*Ancylis nubeculana*.. .. .. .. .. .. .. .. .. 193
*Aphelinus mytilaspidis* .. .. .. .. .. .... 188
*Aphidius avenæ* .. .. .. .. .. .. .. .. ..... 171
*Aphis brassicæ* .. .. .. .. .. .. .. .. .. ... 182
  *mali* .. .. .. .. .. .. .. .. .. .. .. .. ... 193
  *prunifolii* .. .. .. .. .. .. .. .. .. .... 194
Apiary, report on .. .. .. .. .. .. .. ..... 206
  season of 1903 .. .. .. .. .. .. .. .... 206
  insulating hives for outside wintering 207
  is dampness injurious to bees in winter quarters ? .. .. .. .. .. .. .. .. 207
  feeding bees in winter .. .. .. .. .... 203
  foul brood, the McEvoy treatment .. 209
Apple aphis .. .. .. .. .. .. .. .. .. .... 193
Apple-leaf Miner .... .. .. .. .. .. .. .... 193
Apple-leaf Sewer .. .. .. .. .. .. .. .. .. 193
Apple-tree Caterpillar, Red-humped .. 195
Arsenate of lead, for Eye-spotted Budmoth .. .. .. .. .. .. .. .. .. .. .. .... 192
Arsenic, an unsafe insecticide .. .. .... 191
Arsenite of lime with soda .. .. .. .... 191
Arsenoid, green .. .. .. .. . .. .. .... 192
*Asaphes vulgaris* .. .. .. .. .. .. .. .... 171

PAGE.

ENTOMOLOGIST & BOTANIST, Report of—*Con.*
  Asparagus Beetle .. .. .. .. .. .. .. .... 166
  *Aspidiotus perniciosus* .. .. .. .. .. .... 198
  Bacteria-containing nodules of clovers 164
  Bark-louse, Oyster-shell .. .. .. .. .... 188
    Scurfy.. .. .. .. .. .. .. .. .. .. .. .. 188
  Bedford, S. A., on clover growing at Brandon .. .. .. .. .. .. .. .. ..... 164
  Birch skeletonizer .. .. .. .. .. .. .... 204
  Black Rot of the Grape .. .. .. .. .... 187
  Blister-beetle, Spotted Gray .. .. .. .... 176
  Blister-beetles as parasites on locusts.. 175
  Bordeaux mixture for Potato Rot ..... 180
    poisoned for Eye-spotted Bud moth.. 190
    preparation of .. .. .. .. .. .. .. .... 190
  Brome grass, Awnless .. .. .. .. .. .. 163
  Brown Rot of the Plum .. .. .. .. .... 187
  *Bucculatrix canadensisella* .. .... .. ... 204
  Bud-moth, Eye-spotted .. .. .. .. ...... 189
    remedies for .. .. .. .. .. .. .. .. .. 190
  Cabbage Aphis .. .. .. .. .. .. .. .. .. 182
    remedies for .. .. .. .. .. .. .. .. .. 182
  Cabbage Maggot .. .. .. .. .. .. .. .. ... 181
  *Callipterus mucidus* .. .. .. .. .. .. .... 204
  Carbolic wash, for root maggots .. .... 182
  Cattle Horn Fly .. .. .. .. .. .. .. .. ... 167
  *Cecidomyia destructor* .. .. .. .. .. .... 173
    *leguminicola* .. .. .. .. .. .. .. .. .... 177
  *Cephus pygmæus* .. .. .. .. .. .. .. .. .. 172
  Cereals, insect enemies of .. .. .. .... 170
  *Chaitophorus negundinis* .. .. .. .. .. .. 204
  Cheese cloth enclosure, effect on insects 181
  *Chermes abietis* .. .. .. .. .. .. .. .. ....167, 204
    *sibirica* .. .. .. .. .. .. .. .. .. .. .. 167
  Cherry Aphis .. .. .. .. .. .. .. .. ...... 194
    remedies for .. .. .. .. .. .. .. .. .. 194
  *Chionaspis furfura* .. .. .. .. .. .. .... 189
  Chipman, B. W., on crops in Nova Scotia .. .. .. .. .. .. .. .. .... 180, 181, 186
  *Chorizagrotis agrestis* .. .. .. .. .. .... 183
    *auxiliaris*.. .. .. .. .. .. .. .. .. .. .. 183
    *introferens* .. .. .. .. .. .. .. .. .. .. 183
  Clover seed Midge .. .. .. .. .. .. .... 177
  Clovers, in the North-west .. .. .. .. .. 164
    in grass mixtures.. .. .. .. .. .. .. .. 214
  Colorado Potato Beetle .. .. .. .. .... 166
  Corby, Henry, on Hop Aphis .. .. .. .. 178
  Correspondence of the Division .. .. .. 168
  Correspondents, assistance from .. ..163, 168
  Criddle, Norman, on Grain Aphis .. .... 171
    on Locusts .. .. .. .. .. .. .. .. .... 174
    on Sugar-beet Webworm .. .. .. .... 185
  Criddle Mixture, for Locusts .. .. .. .. 176
  Cucumber Beetle, Striped .. .. .. .. .. 181
  Cutworm, Climbing .. .. .. .. .. ..... 183
    Dark-sided .. .. .. .. .. .. .. .. .... 183
    Red-backed .. .. .. .. .. .. .. .. ... 183
  Cutworms .. .. .. .. .. .. .. .. .. ..163, 183
    remedies for .. .. .. .. .. .. .. .. ... 183

PAGE.

ENTOMOLOGIST & BOTANIST, Report of—*Con.*
  *Cylindrosporium padi* .. .. .. .. .. .... 187
  Davis, John, on Wheat-stem Sawfly... 172
  Dewar, W. R., on Pear-tree Flea-louse 197
  Disks of tarred paper, for root maggots 182
  Disparene, for Eye-spotted Bud-moth.. 192
  *Empoasca smaragdula* .. .. .. .. .. .... 204
  *Epicauta maculata* .. .. .. .. .. .. .. .. 176
    *pennsylvanica*.. .. .. .. .. .. .. .... 175
    *sericans* .. .. .. .. .. .. .. .. .. ..... 175
  *Eriocampa cerasi* .. .. .. .. .. .. .. ... 195
  Evans, John D., on Hop Aphis .. .. .... 177
  Fixter, John, report on Apiary .. .... 206
  Fruit crops.. .. .. .. .. .. .. .. .. .. .. 186
    fungous diseases of .. .. .. .. .. .... 187
    insect enemies of .. .. .. .. .. .. .... 188
  *Fumago salicina* .. .. .. .. .. .. .. ..187, 197
  Fungus, Locust .. .. .. .. .. .. .. .. ..174, 175
  Fungus, Sooty .. .. .. .. .. .. .. .. .... 197
  Field crops, insect enemies of .. .. ... 177
  Fisher, Geo. E., on preparation of lime and sulphur wash .. .. .. .. .. .. .. 200
  Fodder crops .. .. .. .. .. .. .. .. .. ... 212
  Fodder plants .. .. .. .. .. .. .. .... ... 163
  Forest and shade trees, insect enemies of .. .. .. .. .. .. .. .. .... .. .... 203
  Foul brood, treatment of .. .. .. .. .. 209
  Fumigation stations .. .. .. .. .. .. .. 199
  Grain Aphis .. .. .. .. .. .. .. .. .. ...166, 171
    parasites of.. .. .. .. .. .. .. .. .. .. 171
  Grain crops, 1903.. .. .. .. .. .. .. .. .. 170
  Grape, Black Rot of the .. .. .. .. ... 187
  Grass mixtures, experiments with .... 214
  Gull, Franklin's, eating locusts .. .... 175
  Hay mixtures .. .. .. .. .. .. .. .. .... 213
  *Hemerocampa leucostigma*.. .. .. .. .. .. 205
  Hessian Fly .. .. .. .. .. .. .. .. ......163, 173
  *Hippodamia convergens*.. .. .. .. .. .. .. 171
    13-*punctata* .. ., .. .. .. .. .. .. .... 171
  Hop Aphis .. .. .. .. .. .. .. .. .. .. 177
    remedies for .. .. .. .. .. .. .. .. ... 179
  Horn Fly, Cattle .. .. .. .. .. .. .. ... 167
    remedy for .. .. .. .. .. .. .. .. .... 167
  Hovering Fly .. .. .. .. .. .. .. .. .... 171
  Hydrocyanic acid fumigation .. .. .... 199
  *Hyphantria textor* .. .. .. .. .. .. .. .. 203
  Insects of the year .. .. .. .. .. .. ... 165
  James, Prof. C. C., on crops in Ontario .. .. .. .. .. .. .. .. .. ... 170, 181, 187
  Kerosene emulsion for Hop Aphis .... 179
    for Plant-lice .. .. .. .. .. .. .. .... 195
  *Læstadia Bidwelli*.. .. .. .. .. .. .. .. .. 187
  *Larus Franklinii* .. .. .. .. .. .. .. ... 175
  Leaf Bug, Four-lined .. .. .. .. .. .. ... 181
  Lime-wash for Oyster-shell Bark-louse 189
  Lime-sulphur-salt wash, preparation of 199
  Lime-soda-sulphur wash .. .. .. .. .... 201
  Lime-sulphur wash, a new .. .. .. .... 202
  *Lixus concavus* .. .. .. .. .. .. .. .. .. 166

PAGE.

ENTOMOLOGIST & BOTANIST, Report of—*Con.*
  Lochhead, Prof. W., on Hessian Fly .. 173
  Locust, Lesser Migratory .. 175
    Packard's .. 175
    Rocky Mountain .. 175
    Two-lined .. 175
  Locusts .. 166, 173
  *Loxostege sticticalis* .. 166
  Lucerne .. 163
  *Lygocerus niger* .. 171
  *Lygus pratensis* .. 181
  Macfarlane, Peter, on root crops in Quebec .. 181
  Maple Soft-scale .. 166, 203
  Marples, J. E., on Sugar-beet Webworm 184
  McMillan, E. J., on root crops in Prince Edward Island .. 173, 181, 186
  Meetings attended by the Entomologist and Botanist .. 167
    by the Apiarist .. 207
  *Melanoplus atlanis* .. 175
    *bivittatus* .. 175
    *Packardii* .. 175
    *spretus* .. 175
  *Monilia fructigena* .. 187
  *Mytilaspis pomorum* .. 188
    *ulmi* .. 188
  *Nectarophora granaria* .. 171
  Negundo Plant-louse .. 204
  Onion Maggot .. 181
  *Onobrychis sativa* .. 212
  *Orgyia leucostigma* .. 205
  Owen, W., on lime-sulphur wash .. 201
  Oyster-shell Bark-louse .. 166, 188
    parasite of .. 188
    remedies for .. 189
  *Pachyneuron*, sp. .. 171
  *Paragrotis messoria* .. 183
    *ochrogaster* .. 183
    *perexcellens* .. 183
    *scandens* .. 183
  Paris green, for Eye-spotted Bud-moth 192
  Paris green mixture for locusts .. 175, 176
    and bran for cutworms .. 184
  Parthenogenesis of plant-lice .. 178
  Pasture mixtures .. 213
  Pea Weevil .. 170
  Pear-leaf Blister-mite .. 166, 198
  Pear-tree Flea-louse .. 166, 196
    remedies for .. 197
  Pear-tree Slug .. 195
    remedies for .. 196
  *Pentilia misella* .. 199
  *Phorodon humuli* .. 177
  *Phoxopteris nubeculana* .. 193
  *Phytoptus pyri* .. 198
  Plant-bug, Tarnished .. 181
  Plant-lice, habits of .. 178
  Plum Aphis .. 194

PAGE.

ENTOMOLOGIST & BOTANIST, Report of—*Con.*
  Plum, Brown Rot or Ripe Rot of the .. 187
  Plum-trees, the Hop Aphis on .. 178
  *Pœcilocapsus lineatus* .. 181
  Potato Beetle, Colorado .. 166
  Potato Rot .. 180
  *Psylla pyricola* .. 196
  *Psylliodes punctulata* .. 177
  *Pulvinaria innumerabilis* .. 167, 203
  Pyrethrum, for root maggots .. 182
  Quassia washes, for Hop Aphis .. 178, 179
  Radish Maggots .. 181
  Rape, fodder .. 215
  Rhubarb Weevil .. 166
  Riley, Prof. C. V., on Hop Aphis .. 178
  Root Maggots .. 166, 181
    remedies for .. 182
  Roots and vegetables, insect enemies of 180
  Sainfoin, its culture .. 212
  San José Scale .. 166, 198
    remedies for .. 199
  Saunders, Dr. Wm., on plant-lice .. 179
  *Schizura concinna* .. 195
  Sears, Prof. F. C., on the Eye-spotted Bud-moth .. 189
  *Siphonophora avenæ* .. 171
  Shutt, F. T., on Lime-sulphur wash .. 202
  Spruce Gall-louse .. 167, 204
  *Syrphus ribesii* .. 171
  Tarnished Plant-bug .. 181
  *Tischeria malifoliella* .. 193
  *Tmetocera ocellana* .. 189
  Turnip Aphis .. 182
    remedies for .. 182
  Tussock-moth, White-marked .. 205
    remedies for .. 205
  Tweddle, Joseph, on preparation of arsenate of lime .. 192
  Vegetables, insect enemies of .. 180
  Wash, English, for Hop Aphis .. 179
    quassia, for Hop Aphis .. 178
  Webworm, Fall .. 167, 203
    Sugar-beet .. 166, 184
      remedies for .. 186
  Whale-oil soap for Hop Aphis .. 179
    for Cabbage and Turnip Aphis .. 182
    for Apple Aphis .. 194
    for green plant-lice .. 194
    for black plant-lice .. 195
  Wheat-stem Sawfly .. 166, 172
  Willing, T. N., on alfalfa growing in the North-west .. 164
  *Xystus tritici* .. 171

EXPERIMENTALIST—Report of the .. 217
  Acknowledgments .. 217
  Barley, six-row .. 228
    Earliest varieties of .. 229
    Most productive varieties of .. 229

PAGE.

EXPERIMENTALIST—Report of the—*Con.*
  Test of varieties of .. 228
  Albert .. 228
  Argyle .. 228
  Baxter .. 228
  Blue Long Head .. 228
  Brome .. 228
  Champion .. 228
  Chinese Hulless .. 228
  Claude .. 228
  Common .. 228
  Empire .. 228
  Garfield .. 228
  Hulless Black .. 228
  Mansfield .. 228
  Mensury .. 228
  Norwegian .. 228
  Nugent .. 228
  Oderbruch .. 228
  Odessa .. 228
  Rennie's Improved .. 228
  Royal .. 228
  Silver King .. 228
  Sisolsk .. 228
  Stella .. 228
  Summit .. 228
  Trooper .. 228
  Yale .. 228
 Barley, two-row .. 229
  Earliest varieties of .. 230
  Most productive varieties of .. 229
  Test of varieties of .. 229
  Beaver .. 229
  Bestehorn's Kaiser .. 229
  Brewer's Favourite .. 229
  Canadian Thorpe .. 229
  Clifford .. 229
  Danish Chevalier .. 229
  Dunham .. 229
  Fichtel Mountain .. 229
  French Chevalier .. 229
  Fulton .. 229
  Gordon .. 229
  Harvey .. 229
  Invincible .. 229
  Jarvis .. 229
  Logan .. 229
  Maltster .. 229
  Newton .. 229
  Pelham .. 229
  Plumage .. 229
  Princess Sialof .. 229
  Sidney .. 229
  Standwell .. 229
 Beans, horse .. 231
  Soja .. 231
 Beets, Sugar .. 235
 Carrots .. 234
 Cereal breeding .. 218

PAGE.

EXPERIMENTALIST—Report of the—*Con.*
 Cross-fertilizing of cereals .. 218
 Descriptions of cross-bred wheats .. 219
 Donations .. 217
 Double rows of grain .. 238
 Earliest varieties of cereals .. 220
 Emmer and Spelt .. 225
  Test of varieties of .. 226
  Black Bearded Spelt .. 226
  Common Emmer .. 225, 226
  Long Emmer .. 226
  Red Emmer .. 226
  Red Spelt .. 226
  Smooth Spelt .. 226
  Thick Emmer .. 226
  Triticum monococcum .. 225, 226
  Ufa Emmer .. 226
  White Emmer .. 226
  White Spelt .. 226
 Grain sown in different quantities on clay loam .. 237
 Grain sown in different quantities on sandy loam .. 237
 Indian corn .. 235
  Sown at different distances .. 236
  Test of varieties of .. 236
 Mangels .. 233
  Test of varieties of .. 234
 Millet .. 232
 Most productive varieties of cereals .. 220
 Oats .. 226
  Earliest varieties of .. 228
  Most productive varieties of .. 228
  Test of varieties of .. 227
  Abundance .. 227
  American Beauty .. 227
  American Triumph .. 227
  Anderbecker .. 227
  Atlantic .. 227
  Australian .. 227
  Banner .. 227
  Bavarian .. 227
  Bestehorn's Abundance .. 227
  Big Four .. 227
  Black Beauty .. 227
  Buckbee's Illinois .. 227
  Chinese Naked .. 226, 227
  Columbus .. 227
  Danish Island .. 227
  Dixon .. 227
  Early Golden Prolific .. 227
  Excelsior .. 226, 227
  Flying Scotchman .. 227
  Forbes .. 227
  Golden Beauty .. 227
  Golden Fleece .. 226, 227
  Golden Giant .. 227
  Golden Tartarian .. 227
  Goldfinder .. 227

PAGE.

- EXPERIMENTALIST—Report of the—*Con.*
  - Great Northern .. .. 227
  - Hazlett's Seizure .. .. 227
  - Holland .. .. 227
  - Holstein Prolific .. .. 227
  - Improved American .. .. 227
  - Improved Ligowo .. .. 227
  - Irish Victor .. .. 227
  - Joanette .. .. 227
  - Kendal Black .. .. 227
  - Kendal White .. .. 227
  - Lincoln .. .. 227
  - Mennonite .. .. 227
  - Milford Black .. .. 227
  - Milford White .. .. 227
  - New Zealand .. .. 227
  - Olive Black .. .. 227
  - Olive White .. .. 227
  - Pense Black .. .. 227
  - Pense White .. .. 227
  - Pioneer .. .. 227
  - Probstey .. .. 227
  - Prolific Black Tartarian .. .. 227
  - Salines .. .. 227
  - Scotch Potato .. .. 227
  - Sensation .. .. 227
  - Sheffield Standard .. .. 226, 227
  - Siberian .. .. 227
  - Sorgenfrei .. .. 227
  - Storm King .. .. 226
  - Swedish Select .. .. 227
  - Tartar King .. .. 227
  - Thousand Dollar .. .. 227
  - Twentieth Century .. .. 227
  - Uberfluss .. .. 227
  - Virginia White Abundance .. .. 227
  - Wallis .. .. 227
  - Waverley .. .. 227
  - Welcome .. .. 228
  - White Giant .. .. 227
  - White Russian .. .. 227
  - White Schonen .. .. 227
  - White Wonder .. .. 228
  - Wide Awake .. .. 227
  - Pease .. .. 230
    - Earliest varieties of .. .. 231
    - Most productive varieties of .. .. 231
    - Test of varieties of .. .. 230
  - Preparation of land for uniform test plots .. .. 219
  - Rye, Spring .. .. 231
  - Selection of grain .. .. 218
  - Spelt. *See* Emmer.
  - Turnips .. .. 232
    - Test of varieties of .. .. 233
  - Uniform test plots of cereals .. .. 219
  - Weather .. .. 220
  - Wheat, Macaroni .. .. 223
    - Test of varieties of .. .. 224

PAGE.

- EXPERIMENTALIST—Report of the—*Con.*
  - Beloturka .. .. 224
  - Black Don .. .. 224
  - Gejar .. .. 224
  - Gharnovka .. .. 224
  - Girgeh .. .. 224
  - Goose .. .. 224
  - Kahla .. .. 224
  - Kubanka .. .. 224
  - Mahmoudi .. .. 224
  - Medeah .. .. 224
  - Mishriki .. .. 224
  - Roumanian .. .. 224
  - Velvet Don .. .. 224
  - Yellow Gharnovka .. .. 224
  - Wheat, Spring .. .. 221
    - Earliest varieties of .. .. 223
    - Most productive varieties of .. .. 222
    - Study of quality of .. .. 223
    - Test of varieties of .. .. 221
    - Admiral .. .. 222
    - Advance .. .. 221
    - Alpha .. .. 222
    - Angus .. .. 222
    - Australian C .. .. 221
    - Australian D .. .. 221
    - Australian E .. .. 222
    - Australian F .. .. 221
    - Australian H .. .. 222
    - Australian I .. .. 221
    - Australian J .. .. 222
    - Australian No. 1 .. .. 221
    - Australian No. 9 .. .. 222
    - Australian No. 10 .. .. 222
    - Australian No. 11 .. .. 222
    - Australian No. 12 .. .. 222
    - Australian No. 13 .. .. 222
    - Australian No. 15 .. .. 222
    - Australian No. 18 .. .. 222
    - Australian No. 19 .. .. 221
    - Australian No. 21 .. .. 221
    - Australian No. 23 .. .. 221
    - Australian No. 25 .. .. 222
    - Australian No. 27 .. .. 221
    - Australian No. 28 .. .. 222
    - Benton .. .. 221
    - Bishop .. .. 222
    - Blair .. .. 222
    - Blue Stem .. .. 221
    - Boyle .. .. 222
    - Byron .. .. 221
    - Cartier .. .. 222
    - Cassel .. .. 222
    - Chester .. .. 222
    - Clyde .. .. 221
    - Colorado .. .. 222
    - Countess .. .. 222
    - Crawford .. .. 222
    - Crown .. .. 221

PAGE.

- EXPERIMENTALIST—Report of the—*Con.*
  - Dawn.. 222
  - Dawson.. 221
  - Dayton.. 222
  - Early Riga.. 222
  - Ebert.. 222
  - Essex.. 221
  - Florence.. 221
  - Fraser.. 222
  - Gehun.. 221
  - Grant.. 222
  - Harold.. 221
  - Harper.. 221
  - Hastings.. 222
  - Haynes' Blue Stem.. 221
  - Herisson Bearded.. 221
  - Hungarian.. 221
  - Huron.. 219, 221
  - Japanese.. 222
  - Laurel.. 219, 222
  - McKendry's Fife.. 221
  - Markham.. 222
  - Marvel.. 221
  - Minnesota No. 163.. 221
  - Morley.. 222
  - Monarch.. 221
  - Newdale.. 222
  - Nixon.. 221
  - Norval.. 221
  - Oregon Club.. 221, 222
  - Orleans.. 221
  - Oxbow.. 221
  - Percy.. 219, 222
  - Plumper.. 222
  - Powell.. 222
  - Power's Fife.. 222
  - Preston.. 219, 221
  - Pringle's Champlain.. 221
  - Progress.. 222
  - Red Fern.. 222
  - Red Fife.. 221
  - Redpath.. 221
  - Red Swedish.. 222
  - Rio Grande.. 222
  - Robin's Rust Proof.. 221
  - Spence.. 222
  - Stanley.. 219, 222
  - Steinwedel.. 222
  - Tracey.. 222
  - Vernon.. 222
  - Weldon.. 221
  - Wellman's Fife.. 221
  - White Connell.. 221
  - White Fife.. 221
  - White Russian.. 221
  - Wheat, winter.. 224
    - Test of varieties of.. 225
    - American Bronze.. 225

PAGE.

- EXPERIMENTALIST—Report of the—*Con.*
    - Bonnell.. 225
    - Buda Pesth.. 225
    - Dawson's Golden Chaff.. 225
    - Early Red Clawson.. 225
    - Egyptian Amber.. 225
    - Gold Coin.. 225
    - Golden Cross.. 225
    - Imperial Amber.. 225
    - Jones' Winter Fife.. 225
    - Long Berry Red.. 225
    - Poole.. 224
    - Pride of Illinois.. 225
    - Red Velvet Chaff.. 224
    - Reliable.. 225
    - Surprise.. 224
    - Tasmania Red.. 224
    - Treadwell.. 225
    - Turkey Red.. 225
    - Velvet Chaff.. 225

- EXPERIMENTAL FARM, AGASSIZ—Report of Superintendent.. 397
  - Apples, report on, with descriptions of new varieties fruiting.. 416-420
  - Apricots, report on.. 424
  - Barley, experiments with.. 400
    - Test of varieties of.. 401
  - Beans, experiments with.. 414
  - Bees, report on.. 399
  - Beets, experiments with.. 414
  - Blackberries, report on.. 426
    - Agawam.. 426
    - Early King.. 426
    - Eldorado.. 426
    - Erie.. 426
    - Maxwell.. 426
    - Rathburn.. 426
    - Stone's Hardy.. 426
    - Snyder.. 426
    - Taylor.. 426
  - Brocoli, experiments with.. 413
  - Brussels Sprouts, experiments with.. 413
  - Cabbage, experiments with.. 413
  - Carrots, experiments with.. 407
    - Test of varieties of.. 408-412
  - Cattle.. 398
  - Cauliflowers, experiments with.. 413
  - Cherries, report on, with descriptions of new varieties, fruiting.. 424
  - Clearing of land.. 398
  - Corn, experiments with.. 404
    - Planted at different distances.. 405
    - Treated with fertilizers.. 406
    - Corn, sweet, experiments with.. 415
  - Correspondence.. 416
  - Cow peas, experiments with.. 412
  - Crops, summary of.. 410

PAGE.

EXPERIMENTAL FARM, AGASSIZ—*Con.*
Currants, Black, report on.. .. .. .. 427
  Baldwin.. .. .. .. .. .. .. .. .. .. 427
  Black Naples.. .. .. .. .. .. .. .. 427
  Boskoop Giant.. .. .. .. .. .. .. 427
  Climax.. .. .. .. .. .. .. .. .. .. 427
  Dominion .. .. .. .. .. .. .. .. .. 427
  Lee's Prolific.. .. .. .. .. .. .. .. 427
  London.. .. .. .. .. .. .. .. .. .. 427
  Merveille de la Gironde .. .. .. .. 427
  Middlesex.. .. .. .. .. .. .. .. .. 427
  Pearce.. .. .. .. .. .. .. .. .. .. 427
  Pomona.. .. .. .. .. .. .. .. .. .... 427
  Prince of Wales.. .. .. .. .. .. .. 427
  Victoria.. .... .. .. .. .. .. .. .. 427
Currants, red and white, report on.... 384
  Gondoin, red.. .. .. .. .. .. .. .. 426
  La Conde.. .. .. .. .. .. .. .. .. 426
  La Fertile .. .. .. .. .. .. .. .. .. 426
  Large White Brandenburg.. .. .. .. 426
  London.. .. .. .. .. .. .. .. .. .. 426
  Pomona.. .. .. .. .. .. .. .. .. .. 426
  Prince Albert.. .. .. .. .. .. .. .. 426
  Raby Castle.. .. .. .... .... .. .. 426
  Red Cherry.. .. .. .. .. .. .. .. .. 426
  Victoria.. .. .. .. .. .. .. .. .. .. 426
  White Cherry.. .. .. .. .. .. .. .. 426
  White Pearl.. .. .. .. .. .. .. .. 426
Distribution of seed grain, potatoes, &c... .. .. .. .. .. .... .... .. .. 416
Ditching.. .. .. .. .. .. .. .. .. .. .. 398
Emmer and Spelt.. .. .. .. .. .. .. 403
Flax, experiments with.. .. .... .. .. 412
Fodder crops, experiments with.. ..410-412
Forest trees, plantations of.. .. .. .. 397
Fowls .. .. .. .. .. .. .. .. .. .. .... 399
Fruit crops.. .. .. .. .. .. .. .. .. .. 397
Grapes, report on.. .. .. .. .. .. .. 424
Hedges.. .. .. .. .. .. .. .. .. .. .. 397
Horses.. .. .. .. .. .. .. .. .. .. .. 398
Horse beans, experiments with.. .. .. 411
Kohl Rabi, experiments with .. .. .. 415
Lettuce, experiments with.. .. .. .. .. 412
Live stock.. .. .. .. .. .. .. .. .. .. 398
Mangels, experiments with.. .. .... 407
  Test of varieties .. .. .. .. .. .. .... 407
Medlars, report on .. .. .. .. .. .... 424
Meteorological report.. .. .. .. .. .. 427
Millets, experiments with.. .. .. .. .. 410
Mixed grain, experiments with.. .. .. 411
Mountain orchards.. .. .. .. .. .. .... 424
Mulberries, report on.. .. .. .. .. .. 424
Nectarines, report on.. .. .. .. .. .. 424
Nut-bearing trees, report on.. .. ..398-425
Oats, experiments with.. .. .. .. .... 399
  Test of varieties of.. .. .. .. .. .. 400
Onions, experiments with.. .. .. .. .. 413
Ornamental trees and shrubs.. .. .... 397
Peaches, report on.. .. .. .. .. .. .. 424

PAGE.

EXPERIMENTAL FARM, AGASSIZ—*Con.*
Pears, report on, with descriptions of new varieties fruiting.. .. .. .. .. 420
Pease, garden, experiments with.. .. 414
  Field, experiments with.. .. .. .. 403
  Test of varieties.. .. .. .. .. .. .... 401
Pigs.. .. .. .. .. .. .. .. .. .. .. .. .. 398
Plums, report on, with descriptions of new varieties fruiting.. .. .. .. 422
Plums, desirable sorts for planting in British Columbia.. .. .. .. .. .. 423
Potatoes, experiments with.. .. .. .. 403
  Test of varieties of.. .. .. .. .. .. 409
  Tests with fertilizers.. .. .. .. .. .. 410
Poultry.. .. .. .. .. .. .. .. .. .. .... 399
Quinces, report on.. .. .. .. .. .. .. 424
Radishes, experiments with.. .. .. .. 412
Raspberries, Black Cap, report on.. 425
  Conrath.. .. .. .. .. .. .. .. .. .. 426
  Gregg.. .. .. .. .. .. .. .. .. .. .. 426
  Ida.. .. .. .. .. .. .. .. .. .. .. .. 426
  Kansas.. .. .. .. .. .. .. .. .. .. .. 426
  Mammoth Cluster.. .. .. .. .. .. .. 426
  Nemaha.. .. .. .. .. .. .. .. .. .. 426
  Older.. .. .. .. .. .. .. .. .. .. .. 426
  Palmer.. .. .. .. .. .. .. .. .. .. 426
  Progress .. .. .. .. .. .. .. .. .. .. 426
Raspberries, red and yellow, report on 425
  All Summer .. .. .. .. .. .. .. .. .. 425
  Belle de Fontenay .. .. .. .. .. .. .. 425
  Cuthbert .. .. .. .. .. .. .. .. .. .. 425
  Duke of Brabant .. .. .. .. .. .. .. 425
  French Vice-President .. .. .. .. .. 425
  Golden Queen .. .. .. .. .. .. .. .. 425
  Hansel .. .. .. .. .. .. .. .. .. .. .. 426
  Large Yellow .. .. .. .. .. .. .. .. 425
  London .. .. .. .. .. .. .. .. .. .... 425
  Lord Beaconsfield .. .. .. .. .. .. .. 425
  New Fastolf .. .. .. .. .. .. .. .. .. 425
  Northumberland Fillbasket .. .. .. 425
  Phœnix Red.. .. .. .. .. .. .. .... 425
  R. B. Whyte .. .. .. .. .. .. .. .. .. 425
  Sarah .. .. .. .. .. .. .. .. .. .. .. 425
  Shaffer's Colossal .. .. .. .. .. .. .. 425
Sheep .. .. .. .. .. .. .. .. .. .. .. .. 398
Small fruits .. .. .. .. .. .. .. .. .... 425
Soja beans, experiments with .. .. .. 411
Squash, experiments with .. .. .. .... 415
Sugar beets, experiments with.. .. .. 408
  Test of varieties of .. .. .. .. .. .. 408
Turnips, experments with .. .. .. .... 406
  Test of varieties of .. .. .. .. .. ... 406
Turnips, table, experiments with .. .. 413
Vegetables .. .. .. .. .. .. .. .. .. .. 412
Velvet beans, experiments with.. .. .. 412
Weather.. .. .. .. .. .. .. .. .. .. .. 397
Wheat fall versus spring sowing.. .. 403
Wheat, spring, experiments with.. .. 401
  Test of varieties of .. .. .. .. .. .. 402

PAGE.

EXPERIMENTAL FARM, BRANDON—Report of the Superintendent 313
Apples, grafted 339-340
Report on 339
Arboretum 343
Awnless Brome grass 332
Barley, experiments with 322-323
Test of varieties of 323-324
Barley, average results of varieties for seven years 323
Barley, methods of preparing land for 324
Beans, experiments with 347
Bees, experiments with 338
*Bromus inermis* 332
Cabbage, experiments with 347
Carrots, experiments with 329
Tests of varieties of 330
Cattle 333
Clovers, experiments with 332
Corn, Indian, experiments with 326
Test of varieties of 327
Corn, pop, experiments with 328
Sown at different distances apart 327
Correspondence 354
Crab apple seedlings, report on 340-341
Crab, transcendant 340
Currants, report on 342
Distribution of seed grain and potatoes 352
Of forest tree seeds 352
Exhibition samples 352
Euonymus linearis 344
Farmers' meetings attended 353
Flax, experiments with 325
Flowers, experiments with 350
Flowering shrubs, report on 343
Fruit trees, experiments with 339
Grain drills, test of 317
Grasses and clovers 332
Hedges, report on 342
Herbs, savory 349
Horse beans, experiments with 323
Horticulture 339
Insects, injurious 352
Lilac, Chas. Tenth 343
Lilac, seedlings 344
Mangels, experiments with 329
Test of varieties of 329
Meetings attended 353
Meteorological report 353
Millets, experiments with 332
New Bridge 352
Oats, experiments with 320
Oats, field plots of 322
Average results of a seven years' test 321
Test of varieties of 321
Onions, experiments with 346
Parsnips, experiments with 348
Peanuts, experiments with 349

PAGE.

EXPERIMENTAL FARM, BRANDON—*Con.*
Pease, field, experiments with 324
Test of varieties of 325-326
Garden 345
Perennial flowers 351
Plum trees, report on 342
Potatoes, experiments with 330
Test of varieties of 331
Poultry, report on 337
*Pyrus baccata* 340
Raspberries, report on 342
Rotation of crops 319-320
Samples for exhibition purposes 352
Seed, fall sowing compared with stratification 344
Shrubs and trees, distribution of 345
Small fruits 342
Squash and pumpkins 346
Steers, experiments in feeding 334-336
Sugar beets, experiments with 330
Sunflowers, experiments with 333
Swine, experiments with 336
Tomatoes, experiments with 348
Top grafting 340
Tree distribution 352
Trees and shrubs, report on 343
Trees, propagation of for Forestry Branch, Dept. Interior 351
Tulips and other bulbs 350
Turnips, experiments with 328
Turnips, test of varieties of 328
Vegetables, suitable for Manitoba 348-349
Vegetable garden 345
Visitors to the Experimental Farm 353
Weather 313
Wheat, Emmer, experiments with 318
Wheat, Spelt, experiments with 318
Wheat 313
Wheat, different methods of preparing land for 316
Wheat, spring, experiments with 313
Field plots of 316
Preventives of smut in 318
Test of fertilizers on 317-318
Selected and unselected seed 315
Test of varieties of 314
Results of seven or eight years' test of 315

EXPERIMENTAL FARM, INDIAN HEAD, N.W.T.: Report of the Superintendent 355
Alfalfa, experiments with 369
*Agropyrum tenerum* 369
Apples, report on 389-390
Arboretum 384-389
Asparagus, experiments with 375
Awnless Brome grass 369

PAGE.

EXPERIMENTAL FARM, INDIAN HEAD—*Con.*
Barley, test of varieties of.. .. .. .. .. 365
  Experiments with.. .. .. .. .. .. .. 364
  Field lots of.. .. .. .. .. .. .. .. .. 364
Barley crop and average yield.. .. .. .. 365
Beans, garden, experiments with.. .. .. 376
Beets, experiments with.. .. .. .. .. .. 376
Breaking and backsetting.. .. .. .. .. .. 360
Brocoli.. .. .. .. .. .. .. .. .. .. .. .. 3 6
*Bromus inermis* .. .. .. .. .. .. .. .. 369
Brussels Sprouts .. .. .. .. .. .. .... 376
Cabbage, experiments with.. .. .. .. .. 377
Canary seed, grass.. .. .. .. .. .. .. 368
  Carrots, experiments with.. .. .. ..373-377
  Test of varieties.. .. .. .. .. .. .. 373
Cattle.. .. .. .. .. .. .. .. .. .. .. .. 392
Cauliflower, experiments with .. .. .... 377
Celery, experiments with.. .. .. .. .. .. 376
Citrons, experiments with.. .. .. .. .... 377
Corn, Indian, experiments with.. .. .. .. 369
  Sown at different distances.. .. .. .. 370
  Test of varieties of.. .. .. .. .. .. 370
Corn, garden.. .. .. .. .. .. .. .. .. 377
Correspondence.. .. .. .. .. .. .. .. 396
Crab apples, Siberian.. .. .. .. .. .. 391
Crops on Experimental Farm.. .. .. .. 355
Crops, summary of.. .. .. .. .. .. .. 374
Cross-bred apples.. .. .. .. .. .. .. 389
Cucumbers, experiments with .. .. .. .. 377
Currants, report on.. .. .. .. .. .. ..390-391
Distribution of grain, potatoes, forest trees, &c... .. .. .. .. .. .. .. .. 395
Experimental Farm crops.. .. .. .. .... 355
Exhibitions, preparations for.. .. .. .. 395
Flax, experiments with.. .. .. .. .. .... 368
Flowers, report on.. .. .. .. .. .. .. .. 381
Forest trees and shrubs, report on distribution of.. .. .. .. .. .. .. .. .. 395
Fruit trees and bushes, report on.. ..389-391
Gasoline engine.. .. .. .. .. .. .. .. 395
Grain, distribution of samples of.. .. 395
Gooseberries, report on.. .. .. .. .. ..390-391
Grasses, experiments with.. .. .. .. .. 369
Hay crop.. .. .. .. .. .. .. .. .. .... 369
Horse beans.. .. .. .. .. .. .. .. .. 369
Horses.. .. .. .. .. .. .. .. .. .. .. 394
Lettuce, experiments with.. .. .. .. .... 378
Mangels, experiments with.. .. .. .. .. 372
Melons, experiments with.. .. .. .. .. .. 378
Meteorological report.. .. .. .. .. .. .. 396
Millets, experiments with.. .. .. .. .. .. 368
Oats, experiments with.. .. .. .. .. .. .. 362
  Field lots of.. .. .. .. .. .. .. .. .. 364
  Test of varieties of.. .. .. .. .. .. .. 363
Onions, experiments with.. .. .. .. .. .. 378
Parsley.. .. .. .. .. .. .. .. .. .. .. .. 380
Parsnips, experiments with.. .. .. .. .. 379
Pease, experiments with.. .. .. .. .. .. 366

PAGE.

EXPERIMENTAL FARM, INDIAN HEAD—*Con.*
Pease garden .. .. .. .. .. .. .. .. .... 379
Test of varieties of.. .. .. .. .. .. .. .. 366
Perennial flowers, report on.. .. .. .. .. 382
Plum trees, report on.. .. .. .. .. .. .. 390
Potatoes, experiments with.. .. .. .. .. 373
  Distribution of.. .. .. .. .. .. .. .. 395
  Test of varieties of.. .. .. .. .. ..373-374
Poultry, report on.. .. .. .. .. .. .. .. 394
Pumpkins, experiments with.. .. .. .. .. 378
Radish, experiments with.. .. .. .. .. .. 379
Rainfall.. .. .. .. .. .. .. .. .. .. .. .. 396
Raspberries, report on.. .. .. .. .. .. .. 391
Rhubarb, experiments with.. .. .. .. .. 380
Roots, field, experiments with.. .. .. .. 371
Rotation of crops, experiments in.. ..363-367
Rye, fall .. .. .. .. .. .. .. .. .. .. .. 369
Rye, spring.. .. .. .. .. .. .. .. .. .. 369
Rye grass, western.. .. .. .. .. .. .. .. 369
Sage.. .. .. .. .. .. .. .. .. .. .. .. .. 380
Seed grain, distribution of.. .. .. .. .... 395
Small fruits.. .. .. .. .. .. .. .. .. .. 391
Soja beans, experiments with.. .. .. .. 368
Spinach, experiments with .. .. .. .. .. 380
Squash, experiments with.. .. .. .. .. .. 378
Steers, experiments with.. .. .. .. ..392-394
Strawberries, report on.. .. .. .. .. .. 392
Summer savory.. .. .. .. .. .. .. .. .. 380
Sunflowers, experiments with.. .. .. .. 368
Sugar beets, experiments with.. .. .. .. 372
Summer fallows .. .. .. .. .. .. .. .. .. 359
Swine, report on.. .. .. .. .. .. .. .. 394
Tares, experiments with.. .. .. .. .. .. 368
Timothy, experiments with.. .. .. .. .. 369
Tomatoes, experiments with.. .. .. .. .. 380
Trees and shrubs.. .. .. .. .. .. .. .... 384
Turnips, experiments with.. .. .. .. .. 371
  Test of varieties.. .. .. .. .. .. .. 371-379
Vegetable garden.. .. .. .. .. .. .. .. 375
Weather.. .. .. .. .. .. .. .. .. .. .. .. 355
Wheat, Spelt and Emmer, experiments with .. .. .. .. .. .. .. .. .. .. ...... 359
Wheat, spring, experiments with.. .. .. 356
  Field lots of.. .. .. .. .. .. .. .. .. 357
  Test of varieties of.. .. .. .. .. .... 353
  Test of bluestone as a smut preventive for.. .. .. .. .. .. .. .. .. .. .. 362
  Test of fertilizers for.. .. .. .. .. .. 358
  Crops and average yield.. .. .. .. .. 358

EXPERIMENTAL FARM, NAPPAN, N. S.:
  Report of the Superintendent .. .. .. .. 263
Acknowledgments.. .. .. .. .. .. .. .. 263
Barley, experiments with .. .. .. .. .. 266
  test of varieties of .. .. .. .. .. .. 267
Bees, experiments with .. .. .. .. .... 296
Buckwheat, field crop of .. .. .. .. .. 271
  experiments with.. .. .. .. .. .. .. .. 270

PAGE.

EXPERIMENTAL FARM, NAPPAN—*Con.*
Bug Death, experiments with .. .. ..296, 297
Carrots, experiments with .. .. .. .... 277
  test of varieties .. .. .. .. .. .. .. 278
Cattle .. .. .. .. .. .. .. .. .. .. .. .... 284
Clovers, experiments with .. .. .. .. .. 281
Corn, Indian, experiments with .. .. .. 272
  field crops of .. .. .. .. .. .. .. .... 273
  planted at different distances .. ...... 273
  test of varieties .. .. .. .. .. .. .. .. 272
Correspondence .. .. .. .. .. .. .. .... 284
Cows, experiments with .. .. .. .. .... 284
Dairy cattle .. .. .. .. .. .. .. .. .. .. 284
Distribution of seed grain and potatoes 283
Exhibitions attended .. .. .. .. .. ..... 283
Experimental Farm crops.. .. .. .. .. 263
Experiments with field grain .. .. .. .. 271
Fertilizers special experiments with..281-282
Flax, experiments with.. .. .. .. .. .. 280
Hay.. .. .. .. .. .. .. .. .. .. .. .. .. .. 232
Horse beans, experiments with.. .. .. 280
Horses .. .. .. .. .. .. .. .. .. .. .. .... 284
Live stock .. .. .. .. .. .. .. .. .. .... 284
Mangels, experiments with .. .. .. .... 275
  field crops of .. .. .. .. .. .. .. .. .. 276
  test of varieties .. .. .. .. .. .. .... 276
Meetings attended .. .. .. .. .. .. .... 284
Meteorological record .. .. .. .. .. .... 298
Milch cows, experiments with .. .. .... 284
Mixed grain field crops .. .. .. .. .. .. 271
Oats, experiments with .. .. .. .. .. .. 264
  test of varieties of .. .. .. .. .. ..265-266
Pease, experiments with .. .. .. .. ... 269
  test of varieties .. .. .. .. .. .. .. .. 269
Pigs .. .. .. .. .. .. .. .. .. .. .. .. .. 294
Potatoes, experiments with 278
  test of varieties of .. .. .. .. .. ..279-280
Poultry .. .. .. .. .. .. .. .. .. .. .... 296
Rainfall .. .. .. .. .. .. .. .. .. .. .... 298
Seed grain and potatoes distributed.... 283
Sheep .. .. .. .. .. .. .. .. .. .. .. .. ... 295
Soja beans, early, experiments with... 280
Steer calf, experiments .. .. .. .. .. .. 288
Steers, experiments with.. .. .. .. .. .. 287
  on limited and full fattening ration.289-294
Sugar beets, experiments with .. ..... 278
  test of varieties .. .. .. .. .. .. .. .. 278
Summary of crops .. .. .. .. .. .. ... 282
Swine, experiments with .. .. .. ....294-295
Turnips, experiments with .. .. .. .... 274
  field crops of .. .. .. .. .. .. .. .... 275
  test of varieties .. .. .. .. .. .. .... 274
Visitors .. .. .. .. .. .. .. .. .. .. ..283-284
Weather .. .. .. .. .. .. .. .. .. .. .. 263
Wheat, spring, experiments with .. .. 267
  test of varieties .. .. .. .. .. .. .. .. 268
  Emmer and Spelt experiments with.. 269

Report of the Horticulturist .. .. .. .. 299

PAGE.

EXPERIMENTAL FARM, NAPPAN—*Con.*
Annual flowerng plants .. .. .. .. .. ...301-303
Apple crop .. .. .. .. .. .. .. .. .. .. .... 299
Cabbage, experiments with .. .. .. .... 308
Cabbage, test of varieties of .. .. .. .. 309
Cherry orchard .. .. .. .. .. .. .. .. .... 300
Corn, garden, test of varieties .. .. ... 307
Currants, red and white .. .. .. .. .. .. 300
Flower garden .. .. .. .. .. .. .. .. .. .. 300
Fruit crops .. .. .. .. .. .. .. .. .. ....299-300
Garden pease .. .. .. .. .. .. .. .. .. .. 303
  test of varieties .. .. .. .. .. .. .. .. 304
Garden, vegetables .. .. .. .. .. .. .... 303
Gooseberries .. .. .. .. .. .. .. .. .. .... 300
Hedges .. .. .. .. .. .. .. .. .. .. .. .... 300
  list of .. .. .. .. .. .. .. .. .. .. .. ... 301
Ornamental trees and shrubs .. .. .... 300
Pease, garden, list of best varieties... 304
Plums .. .. .. .. .. .. .. .. .. .. .. .. ... 300
Potatoes, early, experiments with .. .. 310
Potatoes, results of Liming and not Liming .. .. .. .. .. .. .. .. .. .. ... 311
Raspberries .. .. .. .. .. .. .. .. .. .. ... 300
Shrubs and trees .. .. .. .. .. .. .. .... 300
Strawberries .. .. .. .. .. .. .. .. .. ... 300
Tomatoes,experiments with .. .. .. .. ... 304
Tomatoes, test of varieties .. .. .. .. ..306
Weather .. .. .. .. .. .. .. .. .. .. ...... 299

Fletcher, Dr. J., Entomologist and Botanist—Report of.. .. .. .. .. .. .. .. 163

Gilbert, A. G., Poultry Manager—Report of 240

Grisdale, J. H., Agriculturist—Report of.. 57

HORTICULTURIST of the Central Experimental Farm—Report of .. .. .. .. .. 89
Acknowledgments .. .. .. .. .. .. .. .. 91
Apples .. .. .. .. .. .. .. .. .. .. .. .. .. 92
  Cross-bred.. .. .. .. .. .. .. .. .. .. .. 93
  New or little known varieties of.. .. 95
  Seedling.. .. .. .. .. .. .. .. .. .. ..93, 96
  Shipment to Glasgow in cold storage.. 93
Apple-spot fungus .. .. .. .. .. .. .... 106
Arboretum.. .. .. .. .. .. .. .. .. .. .. .. 121
Black-rot of the Grape .. .. .. .. .. .... 107
Botanic garden .. .. .. .. .. .. .. .. .. 121
Brown-rot .. .. .. .. .. .. .. .. .. .. ... 106
Character of season .. .. .. .. .. .. .. 89
Cherries .. .. .. .. .. .. .. .. .. .. .. ... 100
Climbers with attractive foliage and fruit .. .. .. .. .. .. .. .. .. .. .. ..... 122
Cold storage, shipment of apples to Glasgow in .. .. .. .. .. .. .. .. .... 93
Corn, experiments with .. .. .. .. .. .. 114
Cover crops .. .. .. .. .. .. .. .. .. .. .. 107
  hairy vetch .. .. .. .. .. .. .. .. .... 109
  horse beans .. .. .. .. .. .. .. .. ..... 108

PAGE.

Horticulturist, Report of—*Con.*
Deciduous trees, shrubs and climbers with attractive foliage and fruit .... 122
Diseases of fruits .. .. .. .. .. .. .. .. 106
Donations .. .. .. .. .. .. .. .. .. .. .... 91
Dust spraying .. .. .. .. .. .. .. .. .. ... 105
Enclosure, experiments in growing vegetables in .. .. .. .. .. .. .. .... 118
Forest belts .. .. .. .. .. .. .. .. .. .. 121
Fruit crops .. .. .. .. .. .. .. .. .. .... 90
Fruit, diseases of .. .. .. .. .. .. .. .. 106
individuality of .. .. .. .. .. .. .. .. 102
seedling .. .. .. .. .. .. .. .. .. .... 96
Grapes .. .. .. .. .. .. .. .. .. .. .... 100
Hairy vetch .. .. .. .. .. .. .. .. .. .. 109
Horse beans .. .. .. .. .. .. .. .. .. .... 103
Individuality of fruits .. .. .. .. .. .... 102
List of best vegetables for farmers .. 109
Meetings attended and places visited.. 90
New or little known varieties of apples 95
Peach-leaf curl .. .. .. .. .. .. .. .... 107
Pears .. .. .. .. .. .. .. .. .. .. .. ... 99
Pease .. .. .. .. .. .. .. .. .. .. .. ... 117
experiments for comparison of yield and quality of .. .. .. .. .. .. .... 117
Plums .. .. .. .. .. .. .. .. .. .. .. .. 99
Potatoes .. .. .. .. .. .. .. .. .. .. .... 111
Experiments with.. .. .. .. .. .. .. .. 112
Raspberries .. .. .. .. .. .. .. .. .. 101
Ripe rot .. .. .. .. .. .. .. .. .. .. .. 106
Seedling apples .. .. .. .. .. .. .. ....93, 96
Seedling fruits .. .. .. .. .. .. .. .. .. 96
Shipment of apples to Glasgow in Cold Storage.. .. .. .. .. .. .. .. .. ...... 93
Shrubs, deciduous, with attractive foliage and fruit .. .. .. .. .. .. .... .. 122
Soja beans .. .. .. .. .. .. .. .. .. ..... 108
Spraying .. .. .. .. .. .. .. .. .. .. .. 104
Strawberries .. .. .. .. .. .. .. .. .... 100
Tomatoes, experiments with.. .. .. .. .. 115
Top grafting .. .. .. .. .. .. .. .. .... 93
Trees, deciduous, with attractive foilage and fruit .. .. .. .. .. .. .. .. .... 122
Vegetables, experiments in growing in an enclosure .. .. .. .. .. .. .. .. 118
List of best for farmers.. .. .. .. .. 109
Vegetable crops .. .. .. .. .. .. .. .... 90

Mackay, A., Superintendent Experimental Farm, Indian Head, N.W.T.: Report of 355

Poultry Manager, Report of.. .. .... 240
Artificial Incubation, Results of .. .... 247
A question as to lower prices .. .. ... 243
Breeds, eggs laid by .. .. .. .. .. ..... 251
Breeds, dual purpose .. .. .. .. .. .... 243

PAGE.

Poultry Manager, Report of—*Con.*
Breeds, weight development of .. ..... 252
Commencement of winter laying .. ... 245
Chicken fattening experiments, by F. T. Shutt .. .. .. .. .. .. .. .. .. .... 256
Conclusions *re* egg-preserving substances .. .. .. .. .. .. .. .. .. .. .... 261
Chickens, Progress of the .. .. .. .. .. 252
Detrimental Practices .. .. .. .. .. .... 241
Drawbacks to successful production .. 241
Deductions from hatching results .. .. 250
Different methods of preserving eggs.. 261
Eggs laid during the year .. .. .. .. .. 254
Eggs laid by different breeds in seven months .. .. .. .. .. .. .. .. .. .... 254
Eggs set and chickens hatched .. ..... 250
Experiments in different ways of fattening chickens .. .. .. .. .. .. .. 256
Experience necessary in poultry keeping .. .. .. .. .. .. .. .. .. .. .... 240
Experimental work of the year .. .... 244
Experiences, Summary of .. .. .. .. .. 248
Factors in the production of poultry.. 241
Fertility and strength of germ, Testing of .. .. .. .. .. .. .. .. .. .. .. .. 245
Good results from hardy stock .. .. .... 243
How the hens were set .. .. .... .. .. 249
Hatching results .. .. .. .. .. .. .. ... 250
High prices of eggs last summer .. ... 242
Hatching by hens *vs* Incubator .. ...... 247
Incubators .. .. .. .. .. .. .. .. .. .... 246
Jubilee Orpingtons .. .. .. .. .. .. .... 253
List of stock .. .. .. .. .. .. .. ..... 255
Pen *vs* Crate .. .. .. .. .. .. .. .... 256
Progress of the chickens .. .. .. .. .... 252
Proper treatment of chickens .. .. .... 252
Proper breeds for the farm .. .. .. .. 243
Rations and their fattening effect .. .. 256
Shutt, F. T., preservation of eggs by .... 256
Strain all-important .. .. .. .. .. .. 244
Testing fertility of germ .. .. .. .... 245
When the pullets began to lay .. .. .. 245
Weight development of chickens .. ... 252
What examination of unhatched eggs showed .. .. .. .. .. .. .. .. .. ..... 250
What has led to increased production. 242

Robertson, R., Superintendent Experimental Farm, Nappan, Report of .. .... 263

Saunders, C. E., Experimentalist, Report of 217

Saunders, Wm., Director. Report of .. .... 5

Sharpe, Thomas A., Superintendent Experimental Farm, Agassiz, Report of 307

Shutt, F. T., Chemist, Report of .. .. .... 127

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